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JAN 30 1933

The AIRCRAFT ENGINEER AND AIRSHIPS

No. 1256
Vol. XXV
No. 3

OFFICIAL ORGAN OF THE ROYAL AERO CLUB

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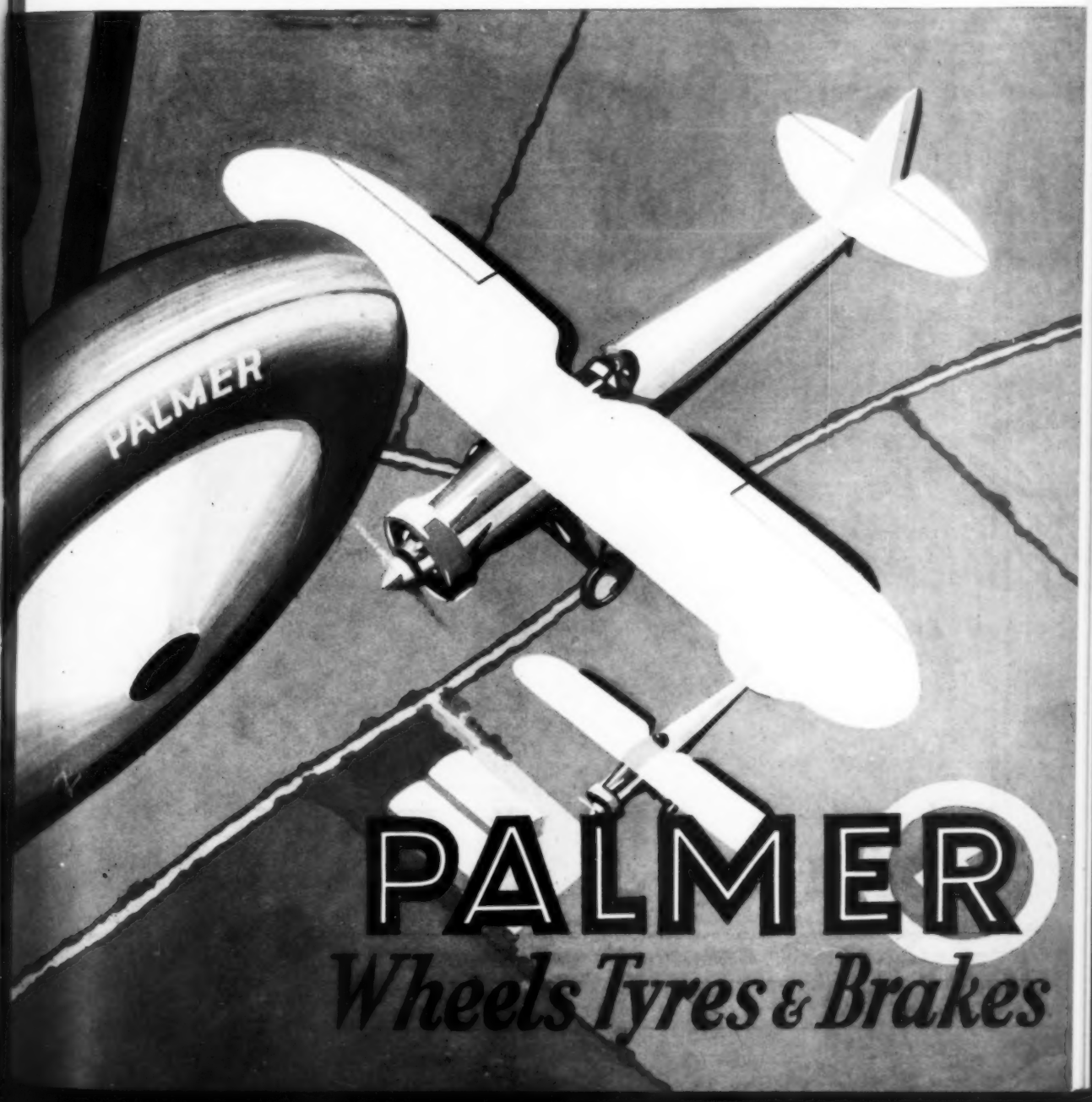

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The AIRCRAFT ENGINEER AND AIRSHIPS

First Aeronautical Weekly in the World. Founded January, 1909

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport

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DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

1933.
Jan. 20. Annual General Meeting of Aircraft Club, Harrogate.
Jan. 24. Lancs.Ae.C. Ball, Midland Hotel, Manchester.
Jan. 26. "Human Limits in Flying." Lecture by Wing-Com. G. S. Marshall before R.Ae.S.
Jan. 26-28. Forest Gate Aviation Show.
Jan. 31. "Detonation." Lecture by F. R. B. King before R.Ae.S., Students' Section. Chairman, H. T. Tizard.
Feb. 1. Entries close for the Deutsche de la Meurthe Cup (Aero Club de France).
Feb. 2. "Operation of Aircraft Over Tropical Routes." Lecture by A. Plesman before R.Ae.S.
Feb. 3. Cinque Ports Flying Club Annual Dinner and Dance at Rl. Pavilion Hotel, Folkestone.
Feb. 8. "Recent Operations in Kurdistan." Lecture by Group-Capt. A. G. R. Garrod before R.U.S.I.
Feb. 8. Herts and Essex Ae.C. Annual Dinner and Dance, Wharncliffe Rooms, Hotel Gt. Central, London.
Feb. 10. Viceroy's Challenge Trophy Race, Delhi.
Feb. 13. "A Review of Air Transport." Lecture by G. E. Woods Humphery before Inst. of Transport.
Feb. 16. "Cloud Formation." Lecture by Sir Gilbert Walker before R.Ae.S.
Feb. 18. Services Rugby: R.A.F. v. R.N., Twickenham 3 p.m.
Mar. 3. No. 25 (F.) Sqd., R.A.F., Re-union Dinner at May Fair Hotel. (Postponed from Jan. 6.)
Mar. 4. Services Rugby: R.N. v. The Army, Twickenham 3 p.m.
Mar. 9. "Engine Cooling Research." Lecture by R. McKinnon Wood before R.Ae.S.
Mar. 23. "Seaplane Research." Lecture by H. M. Garner before R.Ae.S.
Mar. 24. Bristol and Wessex Ae.C. Dance at Grand Spa Hotel.
Mar. 25. Services Rugby: R.A.F. v. The Army, Twickenham 3 p.m.
Mar. 29. "The East African Dependencies." Lecture by H. F. Melland before R.U.S.I. Chairman, Air Vice-Marshal Sir V. Vyvyan.
June 24. Royal Air Force Display, Hendon.

EDITORIAL COMMENT

QUITE a long time has passed since the Royal Aeronautical Society has listened to a paper on Airships, but the account of progress in Germany and America related to the Society on January 12 by Sqd. Ldr. Booth, A.F.C., was of quite exceptional interest, and certainly gave strong support to the opening remarks of the chairman, Mr. C. R. Fairey, that we still had airships with us and were likely to have them with us a good deal more in the future.

Airships Abroad

On the technical side, the ex-captain of R 100 was able to report two innovations of first-class importance. In the United States they certainly seem to have found a satisfactory substitute for goldbeater's skin as a gas container. To find such a substitute was one of the great ambitions of the staff at the Royal Airship Works at Cardington. Research and experiment was constantly carried on, and no doubt the desired substitute would have been found before long. Unfortunately it was not forthcoming in time to be used on R 100 and R 101. Whether the substitute now used in America would have proved strong enough to have resisted the chafing and consequent leakage, which was almost certainly the final cause which brought R 101 down to earth, we do not know. What can be said with certainty is that the cost of goldbeater's skin has hitherto been one of the heaviest items in the cost of construction and maintenance of rigid airships, and the elimination of this item will go a considerable way towards making the airship an economic proposition.

The second great technical advance is the development by the United States Navy of a simple and effective method of handling very large airships on the ground and moving them out of or into their sheds. Such a large ship as the *Akron* could not, said the lecturer, be manhandled in this way except in an absolutely flat calm. Now, by making the nose fast to a travelling tower on rails, and also securing the stern to a travelling beam, also running on rails, it is possible to take the ship out of or into her shed in cross-winds of at least 15 m.p.h.

The appliances are still in an early stage of development, and with further improvements it is expected that the operations will be carried out with safety in still stronger cross-winds.

On the operational side, the American Naval Air Service has now practically perfected the technique of " landing " aeroplanes on the airship and dropping them off from it. Sqd. Ldr. Booth said that this operation is now definitely out of the " stunt " class. He saw many pilots hook their aeroplanes on to the *Akron* for the first time, and they found no difficulty about it. Up to date some 500 " landings " have been made on the *Akron* by day and night without any sort of incident. For naval airships this ease of discharging aeroplanes and picking them up again will probably be of first-class importance. It may also prove a very valuable asset of commercial airships, but this remains to be proved.

Germany can boast of the achievements of the *Graf Zeppelin*. She is the most successful airship which has ever been built, and yet her fineness ratio of 7·75 is admittedly far from ideal. It was determined by the size of the only shed which was available for her construction. The new Zeppelin now building, which is to be named the *Hindenburg*, and is to have a gas capacity of 7,000,000 cubic feet, will have a fineness ratio of 6·02, as against the 5·34 for R 100, 5·9 for R 101, and 5·9 for the *Akron*. It is hoped that she will be able to cruise at 80 m.p.h. She should be a far better ship than the *Graf Zeppelin*, and if she comes up to expectations she should go far to convert the world to a belief in commercial airships for transoceanic travel. An airship which combined the best points of both the present German and present American ships would probably be better still.

In the next few years it should be intensely interesting to compare the performances of the two commercial German airships and the two American naval airships. Whatever doubts may still exist as to the future of commercial airships, we cannot conceive any navy willingly forgoing the advantages of an aerial cruiser which can carry aeroplanes on board. Her speed, her cruising range, and her range of vision, to say nothing of her cheapness when compared with a surface vessel, should make her indispensable.

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Is Civil Aviation Different ?

As might have been expected, the informal discussion at the Royal Aeronautical Society on January 16 added little constructive criticism to the subject of the control of civil aviation. No normal man likes to get up and discuss family affairs in public (unless it be in the divorce courts, where it now seems to have become the fashion to ventilate such subjects), and the relationship between the aircraft industry and the authorities who control civil aviation is very much a family matter. Doubtless this fact was largely responsible for the guarded and vague way in which civil aviation was discussed by the majority of those who took part. Of moans and laments there was no lack, but concrete suggestions for ways and means to improve matters were far less numerous.

General Seely, who opened the discussion, had much more to say about disarmament and British air power than about the control of civil aviation, but what he did say seemed to indicate that he thought of civil aviation as a source of supply of pilots for military aviation rather than as something quite distinct from it and with totally different aims. It is precisely this sort of view which has caused British civil aviation to be in the unhappy state in which it finds itself to-day.

Mr. Handley Page scored a telling point by asking whether civil aviation really does, as at present controlled, differ from military aviation, as the motion had it. That exactly hits the nail on the head. Civil aviation *should* differ, fundamentally, from military aviation, but such has been its development under the military mind that in actual fact the differences are very much smaller than they ought to be. When it comes to Mr. Handley Page's suggestion of handing over the air route control to the General Post Office, we are not with him. As Sir John Higgins said, the Post Office said quite recently, in effect if not in the actual words, that it had no use for the air mails unless they could be carried cheaper than by present ordinary transport, and so long as that view is held at the G.P.O. we do not feel that civil air routes would have anything to gain from being under the Postmaster-General.

Mr. Wingfield voiced, we think, the general feeling of the assembly when he pleaded for " getting down to brass tacks." Get together, agree on a definite policy, and submit concrete suggestions to the Air Ministry, and we would have quite a good chance of getting something done. So long as ten different people advocate ten different remedies we shall get nowhere.

As a basis for discussion, we think the following might be workable. We do not, of course, expect everyone in the aircraft industry to agree with us, but we do think the majority will admit that, broadly speaking, the following scheme might usefully be discussed:—

The operation of regular air routes, and by that we mean air services on which the aircraft are operated to a definite schedule, to be carried on as at present, with Government subsidies and under Government control and supervision.

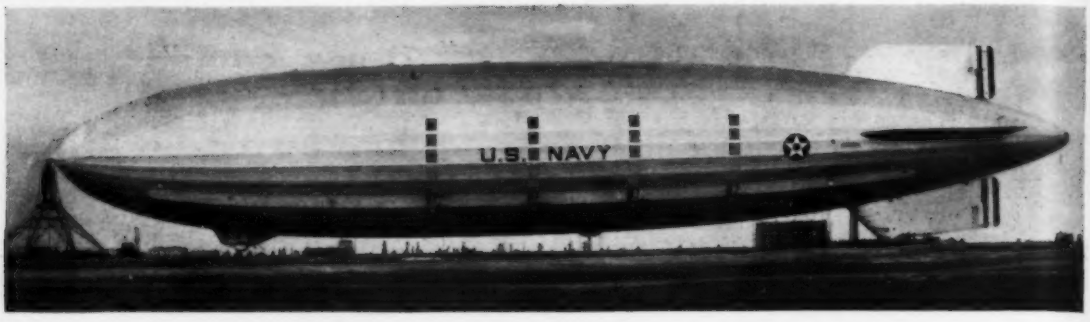
All aircraft not used for flying " for hire or reward " to be removed entirely from Air Ministry or other Government control, excepting in so far as certain simple safety measures, such as anti-fire precautions, navigation lights (if machines used for night flying), etc., are concerned. In other words, take away from the Air Ministry the ridiculous certificate of airworthiness business, and leave it to the constructor to settle between himself, his customer, his conscience, his regard for his reputation, and, of course, the insurance company, what is or is not safe construction. It may be advisable to retain the Air Ministry C. of A. for private machines as an optional alternative, but, for heaven's sake, do not let us retain it as a compulsory regulation. The manufacturer would then have the option of supplying a more expensive machine carrying an Air Ministry C. of A., or a cheaper machine without it.

Certain machines used for taxi work, joy-riding and similar purposes would form an intermediate class, and it should not be impossible to formulate regulations for them, somewhere between the rather strict rules which apply to machines on regular routes and the " free " privately-owned types.

America's New "Clippers"

WHEN the British Government decided, for economic reasons, to cancel the order for the large Supermarine commercial monoplane flying-boat, we expressed the opinion that the step represented a mistaken idea of economy, and that other nations would seize the opportunity to overtake the lead in flying-boat construction which Great Britain had established. Our prophecy has been fulfilled after a very brief interval, as above sketches of two new American flying-boats indicate. These are being constructed for Pan-American Airways, the lower by the Sikorsky Aviation Corporation and the upper by the Glenn L. Martin Company. The Sikorsky will be known as the type S.42, and the Martin as the M.130. Both, it will be noted, are monoplanes, but while the Martin uses sponsons for lateral stability, the Sikorsky makes use of outboard floats.

No information is available concerning the weight of these new boats, but they are reported to be designed for practical operating ranges of about 2,500 miles. Both are to be fitted with four air-cooled engines.



THE "AKRON": The American Airship on her stub mooring mast.
(Photo. by Courtesy of U.S.A. Naval Air Service.)

Airship Development Abroad*

By SQUADRON-LEADER R. S. BOOTH, A.F.C.

Mr. C. R. Fairey, Chairman of the Society, began by remarking that the year was 12 days old, and so far no book had been published this year to prove that airships were no good. All new forms of transport had always met with criticism, but he thought that the criticism of airships had been the most virulent of all. However, we had airships with us still, and he thought that we should have still more of them before long. He then introduced Sqn.-Ldr. Booth, whose paper follows:

LAST year I was fortunate enough to visit Germany and America at the kind invitations of Dr. Eckener and Admiral Moffett, and I hope that a short description of the development abroad will be of interest.

I propose to devote the short time at my disposal to these two countries, as, although France is still building non-rigid and semi-rigid airships for naval work and Russia has embarked on a most extensive airship programme, I think that the recent developments and improvements of the rigid type of airship will be of more interest.

Germany

At the end of the war about 14 naval airships were in commission, but these were naturally of no commercial value, and, with other war material, were immediately handed over to the Allies either as scrap or as complete airships, which were subsequently delivered by air. The Zeppelin Company, however, had a highly-skilled staff and many employees, so work on a commercial ship was immediately put in hand. This ship was called the *Bodensee*, and it was actually constructed in 21 days. This seems almost impossible, but it must be remembered that some of their largest ships were completed during the war in six weeks.

The *Bodensee* was completed and flying by August, 1919, and from August to December she carried out 103 flights, of which 78 were between Friedrichshafen and Berlin—a distance of about 450 miles. Altogether some 2,400 passengers and 35 tons of freight were carried on this route, but in December further flying was prohibited by the Allies, and she was handed over to Italy as "war material" in 1921. A sister airship named the *Nordstern* was not completed until airship flying in Germany was stopped, so that she never flew until 1921 when she was surrendered to France.

This was naturally a blow to the Zeppelin Company, but the staff and a nucleus of the employees were kept busy on the manufacture of agricultural machinery, aluminium castings, tanks, etc., until 1922, when approval was given for a new airship to be built for the American Government as reparations for the ships wilfully destroyed by their crews at the end of the war. Work on this ship was put in hand in 1922, and she would have been completed in 1923 but trials were delayed until the summer of 1924 by the non-delivery of the new 12-cylinder 440-h.p. Maybach engines. These were of an entirely new design and were the first of this famous type which has since proved to be the most reliable airship engine yet produced. All engines were reversible and fitted with roller-bearing main bearings and big ends.

Trials of the new airship, or the *Los Angeles* as she was christened on arrival in America, were completed by the autumn of 1924, and many sceptics wondered whether she would make the Atlantic crossing, which meant a flight of 5,000 miles, or a world's record, if successfully accomplished. As we all remember, the flight actually lasted just over 100 hr., and on arrival over New York over 30 hrs.' fuel still remained on board. The *Los Angeles* was then handed over to the American Navy, and I shall touch on her subsequent history later on in this paper.

Dr. Eckener and his crew then returned to Germany, and, as a result of his enthusiasm and energy and the great belief of the German people in the future of airships, he managed to obtain enough public and government support to build another airship with which to demonstrate the commercial possibilities of this type of aircraft. The construction was started in 1927, and the airship was completed in 1928. The general details of this airship, which was christened *Graf Zeppelin*, are as follow:—

Capacity	4,000,000 cu. ft.
Length	775 ft.
Diameter	100 ft.
Fineness ratio	7·75
No. of engines	5
Maximum speed	80 m.p.h.
Cruising speed	70 m.p.h.
Efficiency (or disposable lift—total lift)	50 per cent.

Actually about 25 per cent. of the hull volume is filled with gaseous fuel or "Blaugas"—this fuel is of the same specific gravity as air and is slightly more efficient than petrol. From an airship point of view, it has a further advantage that there is no change in equilibrium as fuel is consumed. This is of the utmost importance when making oversea flights to poorly-equipped bases, as the minimum of hydrogen is required to replenish the airship and the gas fuel is only slightly more expensive than petrol. Owing to the high efficiency of this airship, the range at cruising speed with 20 passengers on board and 5 tons of freight is approximately 6,000 miles. The external appearance of the *Graf Zeppelin* is quite well known to the British public, as she has visited this country every year since 1930—landing once at Cardington and five times at the London Flying Club, Hanworth. Twenty berths are provided, which can be turned into sofas during the day time. The kitchen, though small, can, however, produce meals equal to the best traditions of the famous Kürgarten Hotel, Friedrichshafen, which is responsible for the catering, as I am sure all who have been fortunate enough to dine on board will admit. Her achievements are also not so well known, as her flights have ceased to be "news" value owing to the monotonous regularity with which they are carried out. In fact, it is quite difficult to find out whether she has arrived at her destination, even if her departure happens to have been mentioned in a sub-paragraph under News from Abroad. This is, however, a good indication of the safety of airship travel of the present day.

*Paper read before the Royal Aeronautical Society on January 12.

Before leaving this ship, I think a *résumé* of her flights should be placed on record. In the summer of 1929 she flew round the world in 310 flying hr., or a total time of 20¼ days, including stops. The route was from Friedrichshafen, via Tokio, Los Angeles and New York, back to Friedrichshafen—a distance of 21,000 miles. Up to date the *Graf* has crossed the Atlantic 29 times, and the Pacific once. She has flown 329,000 statute miles in 5,370 hr., carrying 10,000 passengers and 55 tons of mail and freight, and on the last return flight from South America 40,000 letters were carried. Altogether 290 flights have been made, and it is interesting to note that the original gasbags are still in the ship, and about 80 per cent. of the outer cover—small replacements having been made to the bow and stern sections. Her programme for this year is 15 flights to South America, with a possibility of landing at Barcelona and also extending the service to Rio. When the new ship is completed, a weekly service will be established, and it is hoped that an air mail subsidy will be paid by the South American Governments when these two airships are in commission.

The new airship just mentioned is now under construction at Friedrichshafen. The original capacity of 6,000,000 cu. ft. was increased to 7,000,000 after the *R.101* disaster in order that the airship could be inflated with helium without loss of pay load. The leading dimensions of this ship are as follow:—

Total gas volume	7,000,000 cu. ft.
Length	813 ft.
Diameter	135 ft.

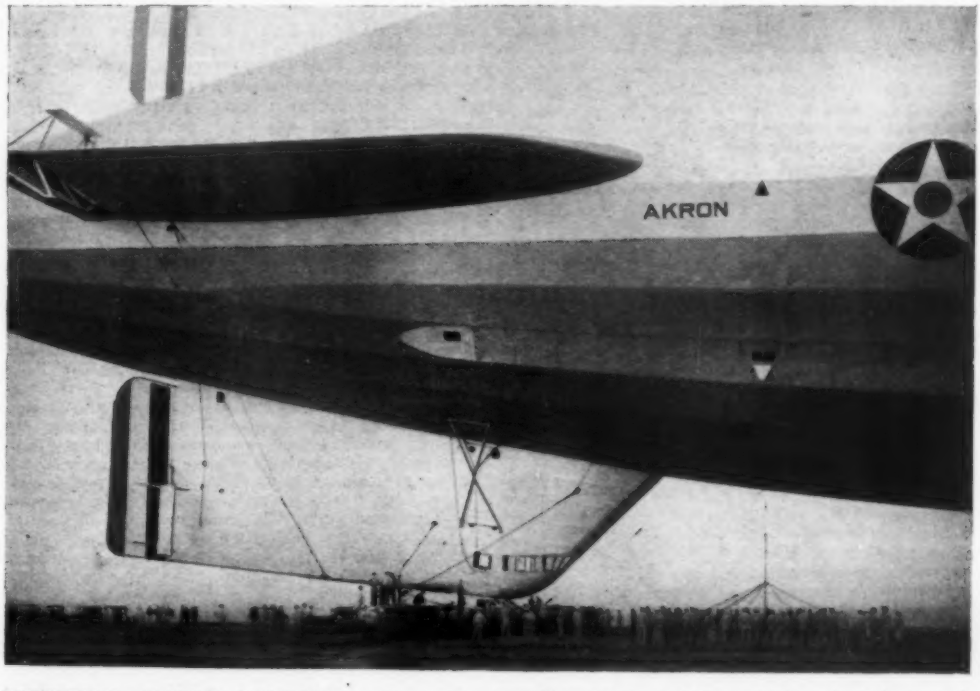
This gives a fineness ratio of 6.02, as compared with 5.34 for *R.100* and 5.9 for *R.101* after the insertion of the new bay. If the engines are ready in time, she will be equipped with four 1,000-h.p. Diesel-type engines, and it is hoped that a cruising speed of 80 m.p.h. will be obtained. The alternative to the 1,000-h.p. engines will be four tandem units each fitted with two 560-h.p. Maybach petrol or gas fuel engines. To avoid valving helium to compensate for the weight of fuel consumed, it is proposed to fit hydrogen gasbags inside the helium bags so that hydrogen gas would normally be valved, but if the ship is carried up in a vertical current it is understood that only the inert helium gas will be discharged. Accommodation for 50 passengers is being provided, the passenger quarters being inside the hull, and the general arrangements not unlike those fitted to *R. 100*. To increase the comfort of passengers on long flights, shower baths will be provided, the water thus expended being pumped back into the ballast tanks. It is hoped that this airship will be finished in the spring of 1934, and it will be of the greatest interest to compare her performance with that of the *Akron* and *Macon*, as these airships will be all of approximately the same size, but will have the fundamental difference that the *Akron* and *Macon* are built with deep section stiff rings similar to the *R.101*, but the new German airship has braced rings and an axial girder like the *R.100*.

This brings the development of German airships up to date, and shows an increase in size of passenger ships since the war from one to seven million—an increase in range from about 1,000 miles to 6,000, and an increase in paying load from 15 to 50 passengers, with a corresponding increase in freight. As only five ships, one not yet completed, have been designed since the war, surely this is a remarkable achievement.

AMERICA

I will now turn to American airship history. In that country only three rigid airships have ever been built, and one of these is not yet completed. The first ship, the *Shenandoah*, was a copy of a German war type which was built for high altitude bombing raids. Naturally, the weight of the structure had been reduced to a minimum, and the risk of failure in the air correspondingly increased. As will be remembered, this actually happened in a severe storm encountered when on a cross-country flight to the Pacific Coast, and a high percentage of the crew was lost. Before this disaster overtook her, the *Shenandoah* had made many notable flights from Lakehurst (including one to the Pacific Coast), several to Bermuda, and had also been extensively used for mooring-out experiments and the training of airship crews. As, however, the new German airship, the *Los Angeles*, had arrived at Lakehurst the previous year, airship development work continued, and this faith has been justified by the achievements of the last few years.

The *Los Angeles* was actually in commission for eight years, and during this period she was constantly employed training airship officers and crews, and also carrying out extensive experiments. She was put out of commission last July for reasons of economy, and on inspection the hull was found to be in excellent condition, and it may



INGENIOUS GROUND HANDLING: The 90-ton travelling beam used for swinging the tail around.
(Photo. by Courtesy of U.S.A. Naval Air Service.)

A " HOOKER-ON " : One of the small machines used by U.S. Navy pilots for flying off and attaching to the Airship " Akron." *(Photo. by Courtesy of U.S.A. Naval Air Service.)*

be noted that about 50 per cent. of the original cover is still on the ship.

Her record during this eight years' commission is briefly as follows:—

Total number of hours flown	4,350
" " " moored out	2,080
" " flights	339
" " miles flown	200,000

The total number of naval officers trained must now be nearly 100, and as the majority of these are now with the Fleet, it is obvious that the American Navy is being educated up to the use of airships so that the best results may be expected when the new airships work with the fleet on manœuvres.

The latest American airship, the *Akron*, constructed by the Goodyear Zeppelin Corporation, with Dr. Arnstein as chief designer, was completed towards the end of 1931. As already mentioned, the hull is constructed of deep section unbraced transverse rings joined by 36 longitudinal girders. Other notable features are the internal engine rooms, swivelling propellers, water recovery apparatus and the internal aeroplane hangar. But perhaps the most important innovation is the construction of the gas-bags, which in this ship for the first time on record are half of a synthetic skin substitute and half of rubber-proofed fabric. The use of gold beaters' skin is thus dispensed with, which reduces the cost considerably, and it is also hoped that the life of the bags will be prolonged.

The general dimensions are as follow:—

Capacity (total)	6,850,000 cu ft.
Length	785 ft.
Diameter	133 ft.
Fineness ratio	5·9
Number of engines	8
Cruising speed	65 m.p.h.
Maximum speed	82 m.p.h.
Efficiency	40 per cent.

From a naval point of view, the aeroplane hangar and the development of the methods of hooking on and housing the machines are of special interest. This evolution was first practised in this country in 1925, using a D.H. 53 aeroplane and a trapeze bar slung from *R.33* ; it has been further developed in America, and a special bar similar to that fitted to the *Akron* was used on the *Los Angeles* for the training of pilots. The *Akron* is, however, the first ship with an internal aeroplane hangar, and actually five single-seater machines of 25 ft. 6 in. span and length 19 ft. can be accommodated. The gear on the aeroplane consists of a propeller guard and a controlled hook which can be tripped by the pilot. Pilots quickly get the knack of making successful " landings," and I have actually witnessed over 100 landings being made on one short flight without incident—and half these landings were by pilots under instruction who had never hooked on before. If their machine is then required to be brought inboard, the bottom hatches are opened and the trapeze bar hauled up by an electric winch ; the machine is then transferred to a corner of the hangar on an overhead runner and the trapeze bar lowered for the next machine. From hooking on to being secured in the hangar takes approximately three minutes, so that five machines could be housed in about 20 minutes. The normal procedure is for the airship to leave the ground with the hangar empty ; the aeroplanes leave the ground at the same time as the airship and are taken on board as soon as the correct height is gained. Up to date some 500 landings have been made to the *Akron*, both by day and night, and it is customary for mails to be brought on board and landed by this method, and also for high officials to be landed from the airship if their duties do not permit them to remain on board for the whole flight. The whole evolution is definitely out of the stunt class, and the machines thus carried could be used for protection or scouting—and, in commercial airships, for landing or taking on board passengers or goods from intermediate stations where ground facilities for landing airships are not available.

Up to date the *Akron* has flown for nearly 2,000 hr., including a flight to the West Coast early last year. She has proved herself to be very handy in the air, and the new features such as the swivelling propellers, panel water recovery, radiators, etc., have given little trouble.

When the *Akron* was under construction the question of ground handling was seriously considered, and an entirely new system evolved which has proved to be so successful in operation that handling airships into the shed with a cross wind up to a maximum of 20 m.p.h. is almost an accomplished fact. We have proved in this country that airships can ride out gales up to 82 m.p.h. on the high tower without sustaining any damage, and as the Americans are on the high road to solving the ground handling problem, two of the fundamental airship handling problems are almost overcome.

The gear used for the *Akron* when being handled in and out of the shed is the ordinary transporter tower running on standard rail tracks, to which the bow cone is secured, and the stern is secured to a transverse beam 186 ft. long which runs on rails 65 ft. apart. The ends of the beam

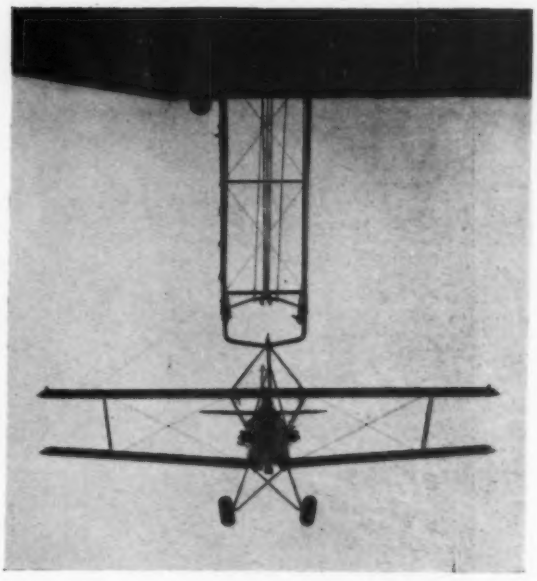
are secured by suitable bridles to the stern of the ship, the bottom fin being secured to the centre. Fore and aft tackles also secure the beam to the ship so that, as the airship is towed out of the shed, the beam maintains its correct relative position. The total weight of this beam is 90 tons.

A turning circle is provided just clear of the shed, the transporter tower stops in the exact centre of this circle, the stern beam is transferred to the circular track by raising one set of bogies and lowering another, and the stern of the airship is then swung down wind by a special locomotive. The airship is then ready to be walked over to the mooring-out circle or to leave the ground as soon as the beam bridles are disconnected.

Conversely, when entering the shed the airship is hauled round to the fore and aft line of the shed, after being attached to the beam, by means of the beam locomotive ; bogies for the parallel tracks are then engaged and the airship walked into the shed securely held at both ends. The locomotive used is specially designed ; it is powered by a 250-h.p. petrol engine and fitted with a Waterbury hydraulic variable-speed transmission. The speed control is therefore extremely sensitive and a maximum speed of 7 m.p.h. can be obtained. The tractive force of this locomotive is 30 tons. I have actually witnessed the *Akron* leave the hangar with a cross wind of 10 m.p.h. giving a lateral load on the tail of 9 tons, and as the stern fittings are designed for a lateral load of 24 tons, it will be appreciated that the ship can be safely handled in a beam wind up to 15 m.p.h., and winds of increasingly higher velocity as the direction approaches the fore and aft line of the shed. Handling an airship of this size without mechanical means would, of course, be absolutely impossible except in a flat calm, and I think that Lt. Bolster, U.S. Navy, who orginated the idea, is to be congratulated on the success of this scheme, which even in this country would make it possible to enter or leave the shed on about 300 days of the year. The great advantage of this system is its simplicity and the fact that there is practically no chance of any hold-up when entering or leaving the hangar, as has often occurred with the side runners as used in Germany during the war and also with the *Los Angeles* at Lakehurst. Further, the equipment is comparatively simple, as standard gauge lines can be used and the weight of the beam is sufficient for all side loads, so no special holding-down devices or expensive concrete foundations to support the rails against heavy side loads are necessary. The new beam now being built for the base at Sunnyvale, California, will have many improvements over the beam I have shown you on the slides, the chief improvement being the incorporation of the locomotive in the beam instead of having a separate unit.

Considerable progress has also been made in the design of transporter towers ; the original one was fitted with caterpillar tracks but these were not very satisfactory, due to the unevenness of the aerodrome. The new tower for the *Akron* was therefore fitted with four-wheel rail bogies, and the tower now under construction will also be telescopic. The advantages of the high and low towers will thus be combined in one structure, and the possible danger of transferring from a high to a low tower before going into the shed is eliminated. The telescopic tower will normally be extended to its maximum height—160 ft.—for landing and leaving, so that a tail-down landing can be made and the take-off will also be facilitated. When moored, the tower will be telescoped and the after car, or tail plane, secured to a rail trolley running on a circular track. Up to date, this system has proved to be quite successful for normal conditions, but it is still questionable whether the low tower is as safe as a high tower in really strong gales such as are experienced every winter in this country. In Sunnyvale such conditions are, however, never experienced, so the telescopic tower and stern beam should meet all requirements and ensure that the ship is never weather-bound in the shed when fleet operations are in progress.

The base at Sunnyvale will be completed early this year ready for the *Macon*, which will be completed in the early spring. The *Macon* is almost identical to the *Akron* —swivelling propellers, water recovery, aeroplane hangar, etc.—but minor alterations and improvements have been made which will give her a slightly better performance, also all the gasbags will be of gelatin-latex proofed fabric, as bags of this type fitted to the *Los Angeles* and *Akron* have proved to be very satisfactory in service. When



ATTACHED : An aeroplane, with engine running, ready to leave the U.S. Airship " Akron."
(Photo. by Courtesy of U.S.A. Naval Air Service.)

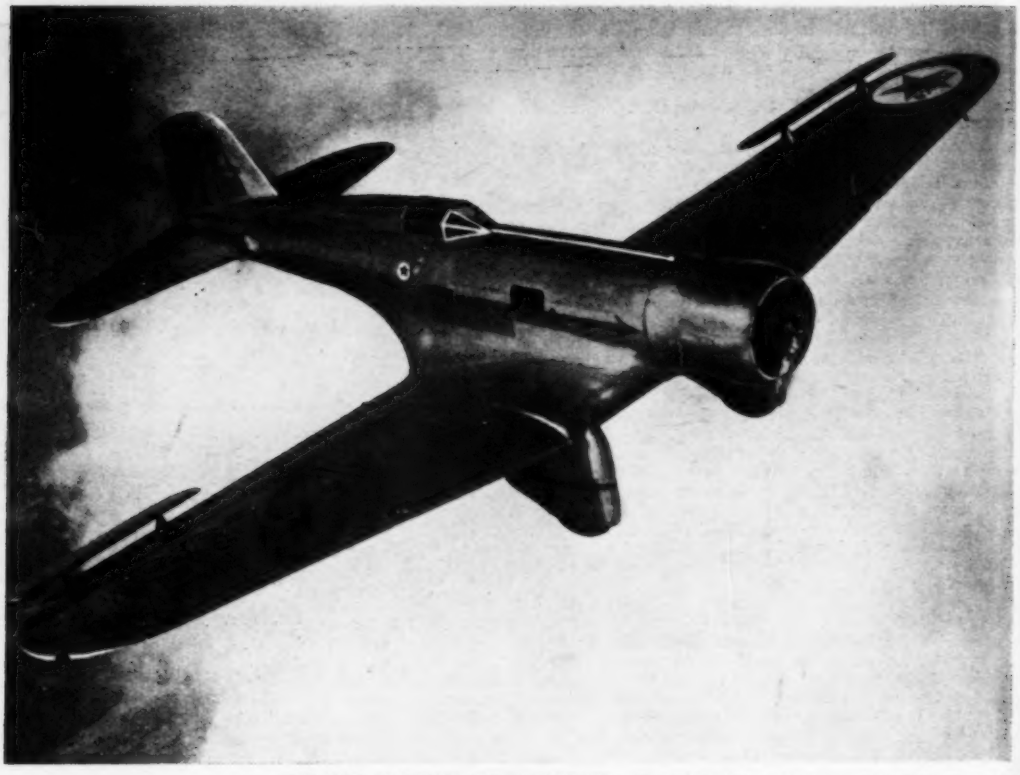
the trials are completed, she will proceed direct to Sunnyvale for fleet co-operation work. This will be the crucial test of airships, as the *Akron* has never had the opportunity of working with the fleet, and the *Los Angeles* was unable to do so—except on one occasion—owing to the agreement made when she was handed over by the Germans.

This concludes the brief *résumé* of rigid airship development in America, but before terminating the paper I should also like to mention the work done by the Goodyear Zeppelin fleet of Blimps during the past few years, and also the development of the Metalclad airship. The Blimps have now made over 32,000 flights, carried over 80,000 passengers, and flown over 1,000,000 miles—and have visited practically every State in America. Last year one flew from Akron to Los Angeles by easy stages. They are extremely easy to fly, as the pressure control is entirely automatic, and if the revenue from the passengers carried is taken into consideration, they must prove to be a very cheap and effective form of advertising.

As regards the Metalclad airship, I am afraid little progress has been made since Mr. Fritsche read his most interesting paper before the Royal Aeronautical Society two and a-half years ago. The original ship is still flying, and on deflation last spring no deterioration of the hull could be found. The gas consumption is extremely low and, although lively in the air in bumpy weather, she is very sensitive on controls and easy to handle. The Metalclad Airship Corporation has projects for ships of two and five million cubic feet, and if given the opportunity there is little doubt that satisfactory ships would eventually be produced. The trouble is that nobody has any money to build the conventional type, and it is doubtful if any new commercial airship company would have enough courage to back such a revolutionary change. It is the greatest pity, as, if airship development continues, the Metalclad may possibly prove to be the most efficient type. Builders of airships dare not, however, experiment nowadays, as any failure completely overshadows years of successful operation.

I have now briefly outlined airship development in Germany and America. In America two naval ships of 7,000,000 cu. ft. displacement will soon be operating with the fleet from a modern airship base, and from Germany two ships will be flying on a commercial route.

The governments and financiers of the world will then have an opportunity of reconsidering their attitude with regard to future airship development.



FRANK HAWKS' NEW MOUNT: The Northrop "Gamma" Transport is fitted with 700-h.p. Wright 14-cylinder engine. Note the "trousered" undercarriage and the oversize fillets which fair the wings into the fuselage. The ailerons are external to the wing.

Cruising at 200 M.P.H.

The new "Gamma," which has been designed and built for Frank Hawks by the Northrop Corporation of Inglewood, California, may be said to represent the incorporation of all the latest knowledge of the subjects of aircraft design and construction. Built somewhat regardless of cost, the Texaco "Sky Chief" will cruise at 200 m.p.h. and have a range of 2,500 miles. Needless to say, the actual pay load at that range and speed will not be great

EVERY aircraft designer must at some time or other have sighed for an entirely free hand to produce a machine exactly to suit his own ideas, incorporating all the latest improvements known to him and his technical staff, and with no restrictions imposed in the matter of cost. He may have got as far as putting such a design on paper, in sketch form at least, but few are the designers who have been fortunate enough to be permitted to translate their "dream ships" into realities. The "Gamma" monoplane recently completed by the Northrop Corporation of Inglewood, California, to the order of the Texas Oil Company, for the use of Frank Hawks, is rather to be regarded as such a design which has materialised. Its practical utility, if regarded in a coldly commercial light, may not be great. But as an example of what a clever designer can do when given a free hand, it is one of the most interesting aircraft produced for many years. Frank Hawks wanted a machine which would cruise at 200 m.p.h. or more, but he also wanted a range of at least 2,000 miles. He will obviously not always be wanting that range, but he wished it to be available when required. One would not expect a machine with that cruising speed and that range to have much accommodation for pay load, and in the new Northrop "Gamma" petrol tanks for the maximum range take up most of the available space. That is not to say, of course, that when the machine is used on shorter ranges and some of the tanks removed, a reasonable pay load space would not be provided.

In looking at the design of the Texaco "Sky Chief," the first and, indeed, almost the only criticism which at once obtrudes itself refers to the view from the cockpit. The pilot must be almost "as blind as a bat." Seated a long way aft of an engine cowl of some 4 ft. diameter, and behind a very sloping windscreen, the pilot must inevitably have a large arc of useful forward and downward view completely cut off. But presumably Frank Hawks intends to make long non-stop flights at altitudes where the air is not yet crowded, and the poor view is one of the sacrifices to high performance.

In general design the "Sky Chief" is a single-engined low-wing cantilever monoplane of all-metal construction with stressed skin covering. It will be noticed that the fuselage is set relatively high on the wing, *i.e.*, it rests on top of the wing rather than having wing and fuselage intersecting. This arrangement, in conjunction with the special fillets used for fairing the wing trailing edges into the fuselage form, has been found, as a result of extensive wind tunnel tests, to give a minimum of interference. In fact, it is claimed that the combined lift of wing and fuselage is greater than the lift of the wing alone, while the drag of the combination is lower than the sum of the

individual drags. In other words, the interference drag is of negative sign. Another advantage is that "buffeting" is claimed to have been entirely eliminated.

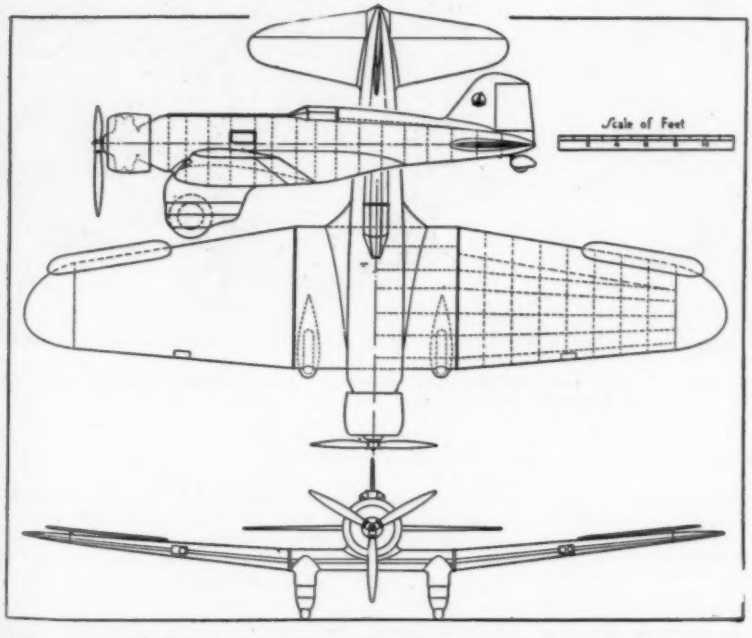
It is worth noting that retractable undercarriages are not used. Tests have shown that the "trousered" legs of the undercarriage as used on the "Sky Chief" have an extremely low drag, and it was thought that under the circumstances retractable undercarriages were not worth their weight and complication. Note that the trousered legs are outside the propeller slipstream.

As the aerodynamic efficiency of aircraft goes up, so the problem of approach for landing becomes increasingly difficult. A "clean" machine will, as soon as its nose is pointed down towards the aerodrome, gain speed rapidly, and on being flattened out will "float" for a long distance before the speed has dropped to the region of the stalling speed. The sideslip is one of the recognised methods of making the glide steeper without gaining too much speed, but at best this is something of a makeshift, and some form of air brake would undoubtedly be an advantage. Fundamentally, what one wants to do is to increase both the lift and the drag, the latter more than the former. In the Northrop "Gamma" built for Hawks, the air brakes take the form of hinged trailing edge flaps. It is not, however, the whole trailing edge which is hinged, but only the lower surface. Results of experiments with a wing flap arrangement somewhat of this type were published in FLIGHT of November 3, 1932, and these showed that lift coefficients in excess of 1 in British "absolute" units could be obtained. At the same time, the L/D ratio was, of course, made very much worse than that of the plain wing section, which is exactly what is required for air braking purposes. The manner in which the flap structure is arranged in the "Sky Chief" is unknown to us at the moment. The photograph of Hawks and Northrop examining it fails to disclose any structure which could reasonably be supposed to be strong enough to take the loads set up, but it is certain that the flaps *are* used on the machine, and it is claimed that they have been found to do effectively what was expected.

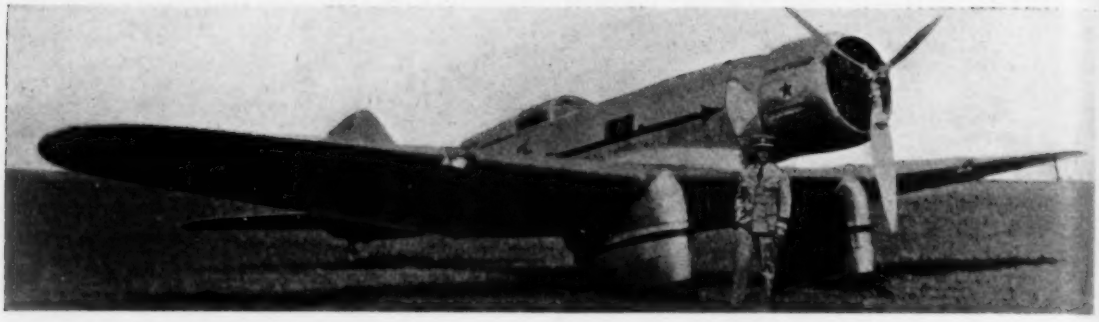
THE AIR BRAKES: Frank Hawks and John Northrop examining the internal structure of the split trailing edge flap.

The split trailing edge flap has the disadvantage that when it is used on the outer wing portions it prevents the use of orthodox ailerons. The Northrop designers have got over the difficulty by fitting ailerons externally to the wing, *i.e.*, not forming part of the trailing edge of the main wing section. These ailerons are mounted on brackets a short distance above the upper wing surface, near the trailing edge, and presumably add a certain amount of drag. This, however, may not be large, and this type of aileron does have the advantage that it is readily balanced, both aerodynamically and statically. Of the behaviour when the main wing is nearing the stall we have no knowledge. It is claimed that with the split flaps down, the lift is increased by about 35 per cent., while the drag is increased between 300 and 400 per cent. If these figures are substantiated, they would show that the gliding angle of the machine can is steepened very materially, while the extra lift would help to reduce the actual stalling speed.

Structurally the "Sky Chief" follows usual Northrop practice, but improvements in the internal stiffening of the metal skin has resulted in higher stresses being developed, with consequent gain in structure weight. For a tare weight of approximately 3,300 lb., the machine has a normal gross weight of 7,100 lb., leaving a disposable load of 3,800 lb. The ratio of gross to tare weight is 2.15, which is a most unusual ratio, and indicates that the machine carries as disposable load 115 per cent. of its own weight. As the wing area is 363 sq. ft., the wing loading is, at 7,100 lb. gross weight, 19.55 lb./sq. ft., which is certainly a good deal higher than anything used on commercial machines. Doubtless it is partly the high wing loading which has enabled the Northrop engineers to get the structure weight down, but in any case for a machine which is designed to cruise at rather more than 200 m.p.h. one *must* have a high wing loading. Whether or not the split trailing edge flaps bring the landing speed down to a reasonable figure, we do not



THE "SKY CHIEF": General arrangement drawings of Frank Hawks' new Northrop machine.



STRESSED METALSKIN CONSTRUCTION: The Northrop "Gamma" ordered by the Texas Oil Co. for the use of Frank Hawks. The machine is credited with a cruising speed of more than 200 m.p.h.

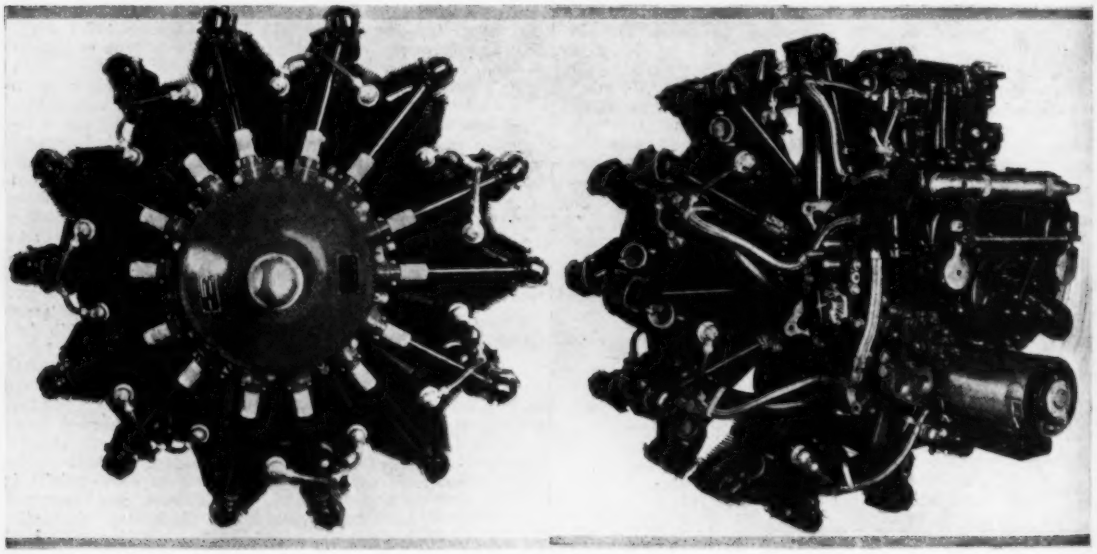
know. Assuming a k_L maximum of 1, the wing loading of 19.55 lb./sq. ft. should give a minimum speed of about 62 m.p.h. The fuel tanks have, however, been so arranged that some of the fuel can be jettisoned in emergency. This would bring the landing speed down possibly to the neighbourhood of 50 m.p.h. For a machine fitted with effective air brakes this would not appear to be an excessive figure, especially as wheel brakes are also fitted.

For Frank Hawks' purposes the "Sky Chief" has been equipped with tanks of a total capacity of 616 American gallons, of which 366 gallons are in wing tanks, and 250 gallons in jettison tanks in the fuselage.

The engine of the "Sky Chief" is one of the new Wright R.1510 double-row 14-cylinder radial air cooled, rated at 700 h.p. at 2,300 r.p.m. It has a bore of 5 in. and a stroke of 5.5 in., giving a total capacity of 1,510 cu. in. The compression ratio is 6.25:1 and the airscrew reduction gear ratio 8:5. The dry weight of the engine is given as 870 lb., and the overall diameter as 45 in. The engine is enclosed in a N.A.C.A. cowling. Eventually the engine is to be supercharged to deliver 600 b.h.p. at 12,000 ft.

Beyond the fact that the cruising speed is in excess of 200 m.p.h. and the range some 2,500 miles, no performance figures are available.

It is to be hoped that Frank Hawks will visit Europe during 1933, but at any rate we may assume that he will be making some very remarkable flights in his own country, and the Los Angeles-New York record is among those likely to be bowled over.



POWER PLANT OF THE "SKY CHIEF": The new Wright R.1510 double-row 14-cylinder engine is rated at 700 b.h.p. at 2,300 r.p.m.

High Flying in the Service

IN the December issue of *The Hawk*, the journal of the Royal Air Force Staff College, there is an interesting article entitled "High Flying, a Service Problem." The writer deals at some length with the problem of supplying oxygen to the occupants of the aircraft at high altitudes, and the methods employed to keep them warm in a temperature well below freezing point. He suggests that heat supplied from the exhausts or from the radiator would be more effective than electrical heating, but what would then happen if the engine cut out at a high altitude? As is pointed out elsewhere in the article, much of the fighting in the next war will be at high altitudes, so it is essential that our war machines are fitted with the most efficient type of heating and oxygen apparatus.

An indication of the extreme cold which is experienced at high altitudes can be obtained from the curious phenomenon of a white cloud, sometimes nearly half a mile long, which trails behind a machine flying at a great height; it is caused by the particles of moisture in the exhaust gases freezing as soon as they leave the pipe.

"CIVIL AVIATION IS DIFFERENT"

THE informal discussion on civil aviation took place on Monday evening, January 16. It was arranged by the Royal Aeronautical Society. The chairman, Mr. C. R. Fairey, in his opening remarks, said the Royal Aeronautical Society first established itself 67 years 4 days ago for the purpose of advancing the cause of aviation. Free discussion did advance causes, and they therefore now had an informal debate. On November 3 last, following a paper given by Maj. H. G. Travers, there was an interesting discussion which was not entirely finished in the opinion of many people. The scope for discussion had widened out to cover the whole control of civil aviation. He would point out that the Society welcomed all views, but was responsible for none. Looming much larger at the moment was the threat of international control of all aviation. Much had happened at Geneva which might have a profound effect on the future of British aviation, and it was quite time this question was ventilated. Whatever happened, we should probably come off worst. Mr. Fairey then said the motion of the debate was "That civil aviation differs from military aviation and should be treated accordingly." In this country we had worked out a compromise, a balance between control and liberty in civil aviation, which, he felt, seemed to work reasonably well, but if the balance swayed too much one way or the other there were many voices raised. We had been fortunate in the personalities who had been in control. On the military side we appeared to disarm, but other powers did not. Our Air Force was very weak indeed for our needs, and it was good to know at this stage of affairs that there are those in this country who are not afraid to speak out on this point. Mr. Fairey then said that it was very gratifying indeed to have to introduce the opener of the debate, Maj. Gen. J. E. B. Seely, who had always shown himself very alert indeed when the interests of the country were at stake.

MAJ. GEN. SEELY said that it seemed to him there was a danger to Britain's life and interest, and that danger was that there might be an undue reduction of our air power, both civil and military. There were those who were keen about combination and others who were keen about nationalism, but to him the one thing which seemed to be vital to the needs of Britain in the air was an independent air force and an independent Air Ministry, which should be charged with duties both civil and military in Britain. Britain should keep her place in the air because she was the centre of the biggest aggregation of people in the world, at the greatest distance apart. Therefore intercommunication to us was more necessary than to any other nation. The military side of aviation was even more important, because the ever growing air control was vital to many places over which H.M. the King holds sway. General Seely then said that he wished to say quite definitely, since the question of disarmament and the reduction of the Air Force had been mentioned, that it was altogether wrong to say that air power was a dangerous and wicked thing to peace. Air power was the least cruel of all means of control. All were cruel, but air control was the least cruel. He did not know how many defenceless women and children were killed in air raids during the War, but whatever the number was, at least a hundred times more came to their end and died as a result of the blockade and the submarine campaign. In any future war it would certainly be true that a blockade would kill many thousands for every 100 killed by the long-range aerial gun, which was what the bomber was. The Air Force had saved millions of money and thousands of lives. To hand civil aviation over to the Board of Trade, he felt, would be disastrous, taking into consideration all the things they had in common. The best pilots, he said, were drawn from the same group of gallant souls who were prepared to go in for civil or military aviation. They must have the best design in aircraft. The same problems faced the designer of civil aircraft as the designer of military aircraft. Britain, he said, leads the world in the design of aircraft engines, and he felt it was only because there was a central authority. We had to have the best meteorological forecasts and knowledge, the best landing grounds. Civil aviation relied on the Air Ministry for support. We had a central sympathetic authority, and civil aviation could not do a tithe of what it was doing if taken away from the Air Ministry.

MR. HANDLEY PAGE said the motion was that civil aviation differs from military aviation, but actually did civil aviation differ from military aviation at the present time? In military aviation we had one single authority expressing one opinion, a single authority with unity of purpose. Some people said the Air Ministry had no unity of purpose, but that, he said, was not a question to be raised there. When one turned to civil aviation, one had customers with a whole range and variety of tastes. One customer would choose his machine for comfort. He wanted to buy a machine which was cheap in first cost and cheap to run, and also of high efficiency. With all these varying requirements no single authority like the Air Ministry could determine a design. Why should State direction interfere with design? he asked. The State came in via subsidies and regulations. The result of subsidies in the case of our flying clubs was to put them on their feet. These subsidies had been given to help the nation to become air-minded. They had led to a very great expansion in light aircraft. Really there was no more reason to subsidise flying than other industries. If machines could be more cheaply built, there would be no need for subsidies. Since the beginning of 1928 no less than £18,000,000 had been expended or ear-marked for direct air subsidies. Air communications were of vital importance to us, but it might be better in this country, as it was a question of communication, that the matter be attended to by the Post Office. If the Post Office replied that it would not pay, we might very profitably draw their attention to the telegraph system of this country. Over one million had been lost by the country, but it was considered essential to maintain the telegraphs. Equally well we might claim air communication was essential to the Empire. Last year some 20,000 tons of goods, mails and passengers were carried by air, and £4,000,000 had been expended in subsidies. The countries in Europe paid £16 for every passenger carried by air. The only way by which State control could be avoided, unless the subsidy be abolished and the Post Office have control, was that no contract should be allowed to show more than 33⅓ per cent. profit to the operating company. Now 85 per cent. of their receipts came from subsidies.

Turning to small aircraft, the subsidy had been given to the clubs, from which the small machines had grown up. The time had come, he thought, when the aircraft industry should be no longer dependent on the money of the Air Ministry. If you made every aircraft carry a compulsory insurance policy, one which insured the aircraft, passenger, pilot and third party risks on the ground, you removed all question of international control.

CAPT. BALFOUR, M.P., said he ranged himself with Mr. Handley Page. The question of air disarmament, he said, was approached in the House of Commons in a spirit of ignorance and sloppy sentimentality. The majority of the Members knew nothing of the technical problems. It would need a great deal of pressure to remove the present sentiments. Horrible pictures were painted of the killing of women and children by aircraft. Actually the proper view to take was that it did not matter very much about killing women and children. If another war were to happen—they all hoped it would not—but if it did, it would be over all the quicker because only the country which had faith in the justice of its cause would face the horrors which air warfare would bring to the civilian population.

During the present efforts in the House and in the Press to get air disarmament, we might, Capt. Balfour thought, make a counter offensive by asking for a policy of substitution. The other services were doing their best to get back the control of their air forces. He referred to the dangers of bureaucracy, and said the vested interests of bureaucracy were greater than the vested interests of property, and would be hard to dislodge. One difficulty was that at present we had such charming officials. But we had to remember that some day we might not have charming officials. It was a case of the smile on the tiger's face. In conclusion, Capt. Balfour said he felt that

civil aviation *must* be taken away from control by military influence. He did not want it taken away from the Air Ministry, but the control must not be of a military character.

MR. E. C. GORDON ENGLAND said he would like to cross swords with General Seely, whom, he thought, must be giving voice to the new views of the Air League. He did not agree that a central authority for civil and military aviation was desirable, and he did not agree that civil and military aviation were interwoven in the manner suggested by General Seely. On all the heads where General Seely saw similarities in requirements he (Gordon England) saw radical differences. The trouble with civil aviation was that we had regarded it as a military appendage. What did the civil aviator want? He wanted transportation, he wanted nothing else, economical and efficient transportation, and that was what he purchased, and with it, perhaps, a certain amount of enjoyment. He wanted something cheap and easy to handle. How could he get that from a military-minded control? Take a regulation like that governing rate of climb. Only a military mind wanted rate of climb. Some would say it was necessary for safety. He would point out that the Autogiro machine could get out of a small field and get back into it without trouble, and so could the small Lowe-Wylde aeroplanes now functioning at Hanworth. They could literally get out of a field 120 yards square and get back safely, but they could not meet the official take-off requirements.

SIR JOHN HIGGINS said there was an old saying that a poacher made the best gamekeeper. He did not know if the reverse held good. (Sir John was, before joining the Siddeley concerns, Air Member for Supply and Research at the Air Ministry.) Compromise was ever dear to the Englishman, and he thought in this matter of civil aviation compromise was the best solution. Mr. Handley Page appeared to deplore subsidies. He believed that had it not been for the subsidies paid and the help given by the various subsidiary services and auxiliary services run by the Air Ministry civil aviation would not have been in the position it is to-day. With Mr. Handley Page's suggestion that the Post Office should take over the air routes, the Post Office had recently said, in effect if not in the actual words, that they had no use for the air mails, and would not do much about them until air mails were cheaper than transporting mails by older methods. At present we had at least an authority which was sympathetic. He said he entirely agreed that civil aviation does differ from military aviation and should be treated accordingly, but he said he considered it *was* treated accordingly now. There is a section, at the Air Ministry, he said, entirely devoted to civil aviation. There had to be some control of civil aviation. It could not be left to run absolutely wild; there must be some kind of regulations. Surely they were only jumping out of the frying pan into the fire if we took the control of aviation away from a body of people who at any rate knew something about it and were sympathetic to it and placed it under some other body which had very little interest in it and knew nothing about it. He said he agreed that anyone should be allowed to break his own neck in his own garden so long as he did not break anyone else's. He also felt it was absolutely essential for air liners to be under some form of control, but that control should be minimized as much as possible. There were two distinct forms of civil aviation, one purely for transport and the other purely for sport, and the less control was exercised by the Air Ministry over the purely sporting form of aviation the better.

MR. WHITESIDE, M.P., said that far too little interest in aviation was taken in the House of Commons and the interest shown in the country was of the wrong kind. What other interest there was, was being stifled by the Air Ministry! If a naval question was raised in the House, there would be dozens of naval officers there expressing their views, but so far as the air was concerned there was no interest at all. Mr. Perkins occasionally talked about women pilots, and they sometimes got a few sane remarks from Mr. Simmonds. The Air Minister was very rarely in the House as there were few questions for him to answer. He pleaded that Members should be given questions which they could ask. Civil aviation was infinitely more important than military aviation. No interest was taken by the designers themselves in civil aviation. We heard about Amy Johnson and various record flights, but we heard nothing about the K.L.M. regular service to the East, running 1,500 miles in one day. He said that in the case of any town planning scheme brought up in the House, it should be asked what facilities were offered for a future aerodrome for he said in that way we should be doing something for aviation. They should try to educate the public to appreciate that civil aviation was a great power for peace by bringing people together.

MR. J. D. NORTH said he thought there was a distinct difference between civil and military aviation. In the one case the aeroplane was purchased by the State and in the other case it was purchased by an individual, or company. When anything had to be purchased by the State it was absolutely essential that it should give the impression that the taxpayer was getting much for his money. In the case of private aviation he felt that circumstances were quite different, and that if some of the spirit in flying which existed in 1912–1914 could be recaptured, it would be of great benefit to aviation. He said he had never been able to understand and he had never heard why an aeroplane should be subjected to a different kind of regulation to that of any other vehicle, particularly in the case of the private owner. He said he did not think the private owner was more of a danger to his fellows than the man on the road. There were many accidents on the roads, but no one suggested motor car design should be regulated. He felt there was no reason why an aeroplane should not be sold on its reputation as the motor car is. The trouble with official regulations was that one could not put into regulations the considered views of the engineer. He suggested that an effort should be made to get back to the position of 1919, when a man could go up and break his neck if he wished to without interference. They all knew that licence did not mean liberty.

MR. O. E. SIMMONDS, M.P., said he regarded the motion before the Society as of considerable importance. He had read it carefully, and he had come to the conclusion that one could be in order in voting for it whether one interpreted it one way or the other. He would submit that the attitude of the Air Ministry to Civil Aviation *was* different. It encouraged military aviation and discouraged civil aviation. One had to ask oneself what was the Air Council's idea of what the civil aviation department should be, and he thought one must arrive at the answer that the Air Council wanted the civil aviation department to be a spineless, gutless thing, a mere filing office. Examine what happened if one went to the civil aviation department for a decision on any subject. If one wanted a decision on a technical point, would the department give its own mind? It would not. It would give the mind of Farnborough. Should one want a ruling on a question of performance, would the department give its own mind? It would not. It would give the mind of Martlesham. If one sought advice on a question of inspection, would the department give its own mind? It would not. It would give the mind of Alexandra House. The department, he repeated, was nothing but a filing office.

MR. LAURENCE WINGFIELD said much attention had been directed to the question of control, but he felt that the aircraft industry had to have some form of control, as did the shipping industry, railways or factories. The industry would only need to get down to concrete proposals and say what standards it wanted, and he felt that when the Air Ministry was told definitely what was required, the industry would receive a sympathetic hearing.

MR. C. C. WALKER said the present-day system was hampering the advancement of civil aircraft, and the sooner it could be changed the better it would be. He also said he believed the Air Ministry knew this and were in favour of shedding some of its responsibility, and he hoped that anybody who had any influence would try and get this system changed.

More Fairey Aeroplanes for Belgium

THE Fairey Aviation Company have received an order from the Belgian Government for "Firefly" interceptor fighters, and also for an increased number of "Fox" day bombers. This is the third successive year that Fairey machines have been supplied to Belgium.

Mexico Not Disarming

THE Mexican Government have decided to re-equip their Navy and Air Force. Fifteen light cruisers have been ordered from Spain and 20 of the newest type fighter aeroplanes are being built in Mexico. The cruisers will be completed by 1934.

THE DEATH OF MISS WINIFRED SPOONER

WE very much regret to have to record the death from influenza of Miss Winifred Spooner. She was ill only for one day, and it is stated that she had practically never been ill before. On Friday, 13th, her condition became alarming and a specialist was sent for to her home at Radcliffe Aerodrome, Leicester. Injections of strychnine were tried, but Miss Spooner died. Her brother was with her at the end. Winifred Evelyn Spooner was born in September, 1900, and was the daughter of the late Maj. and Mrs. W. B. Spooner.

Every authority is agreed that Miss Spooner was a pilot of the first water, and she was at the time of her death the only British woman who made a profession of air piloting. She was the private pilot of Mr. L. Everard, M.P.

Miss Winifred Spooner first came into prominence in the King's Cup Race of 1928, when she finished third, being beaten only by such distinguished pilots as Capt. Hope and Mr. Uwins. Being the first member of a flying club to arrive home at Brooklands, she won the Siddeley Trophy. Thereafter her flying activities were incessant, and her successes in air contests were numerous. She was a country girl, athletic in figure and handsome in appearance, and everything she did was characterised by extreme thoroughness.

Miss Spooner's greatest feat was to gain fourth place in the International Touring Competition organised by the German Aero Club in August, 1930. This was an elaborate competition in which marks were given for a number of points of machines and of piloting, as well as for a tour round Europe. The entry was large, and it was a great honour for Miss Spooner to achieve so high a place. A few weeks later Miss Spooner further distinguished herself by gaining fourth place in the Giro Aereo d'Italia, or Circuit of Italy. In both these competitions she flew a "Gipsy Moth."

At the end of December in the same year Miss Spooner made her one attempt to set up a long cross-country record by flying from England to Capetown. F/O. E. C. T. Edwards accompanied her, and the machine chosen was a Desoutter. For some reason they came down by night in the sea off Belmonte, in Italy. The two got out of the cabin and then lost each other. Both were fine athletes, and both swam ashore, a distance of two miles.

Miss Spooner's funeral took place on Tuesday at Hinton Parva, near Swindon, and a Memorial Service was held at St. Peter's, Eaton Square, London, on Wednesday, January 18.

(*Messages of condolence on p.* 67)

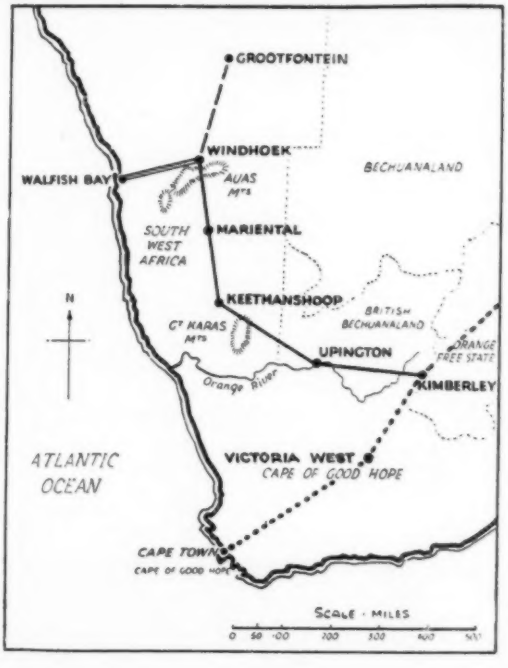
REMINISCENCES OF THE LATE MISS WINIFRED SPOONER : On the right, during a light aeroplane meeting at Orly, France, and below, with Mr. Lindsay Everard, M.P., and Mr. Nigel Norman, at Heston, on the occasion of a night-flying demonstration. (FLIGHT *Photos.*)

Air Transport

THE SOUTH-WEST AFRICAN AIR SERVICES

TRAVELLING by air in South Africa is no longer a novelty. It is safe, pleasant, comfortable and speedy and owing to these virtues the South African public are slowly learning that to travel by air is neither an extravagance nor a luxury. This change in public opinion towards commercial aviation can best be shown by examining one particular service.

South West African Airways provides an excellent example. The air mail contract was given out last year, but when the time stipulated for the commencement of the service from Windhoek to Kimberley arrived, the London-Cape Town service was not ready, due to the mass of detail work necessary in starting an air line of such magnitude. So in order that the Territory which subsidises South West Airways, to the extent of £7,000 per annum, should not have to bear unreproductive expenditure, an internal service was inaugurated between Windhoek and Grootfontein in the North and Windhoek and Keetmanshoop in the South. Planes were also scheduled



Above are shown some of the Junkers (Armstrong-Siddeley engines) machines operated by South West African Air Lines between Kimberley and Windhoek (see map). Below (left) one of the machines is seen flying over Windhoek Aerodrome, which is 5,500 ft. above sea level; the Auas Mountains are in the background. On the right Maj. Miller is seen refuelling the large Junkers prior to a flight from Windhoek to Johannesburg.

to meet all incoming boats at Walvis Bay. This service was carried on successfully until Imperial Airways were ready.

On January 26, 1932, the Windhoek-Kimberley service was inaugurated and the internal service was abandoned. Every week a South West Airways plane leaves Windhoek on Tuesday night is spent at Keetmanshoop and the journey resumed the afternoon for Kimberley. The following morning to Kimberley via Upington, where the plane lands to pick up mails. The plane and pilot remain at Kimberley until Sunday morning, when the south-bound Imperial Airways liner arrives, and the mails for the Territory are transferred. The pilot makes for Mariental, which is about 190 miles from Windhoek, stopping at Upington and Keetmanshoop *en route*. Early the following morning the plane leaves Mariental and arrives at Windhoek in time for the mails to be sorted when the office is opened. Quite often, provided weather conditions are favourable and the light holds out, the journey from Kimberley to Windhoek is completed in one day, leaving at 9.30 a.m. and arriving just after 7 p.m.

South West African Air Lines operate over this mountain range between Keetmanshoop and Mariental at a height of over 7,000 ft.

A brief glance at the record of the South West Airways is sufficient to convince one of the efficiency and regularity of the service. From August 1, 1931, to July 31, 1932, they carried out 168 through trips for air mail services, covering 78,324 miles in the flying time of 906 hr. at an average speed of 86.5 m.p.h. 187 passengers were carried during the air mail trips. Besides the air mail trips many others were carried out for business, domestic or pleasure purposes, bringing the total mileage up to 98,277 over a flying time of 1,167.11 hr. and carrying 598 passengers. At no time during the period under review were there any forced landings nor were any accidents or losses incurred. No claims were made against the Airways, and, in short, their organisation and efficiency was 100 per cent.

The number of passengers, the amount of air mail matter and the freight carried are steadily increasing. From every aspect the service shows promising signs of development and increased passengers.

The remarkable efficiency of the Airways is not alone due to the high standard of their organisation, but also to the wonderful capabilities of their pilots and the efficiency of their aircraft. Compelled as they are to fly under most exacting conditions, more often than not adverse in the extreme, the fine record of the South West Airways is deserving of special praise. Not only must their pilots be first class, but their aircraft—Junkers all-metal monoplanes—too, must be capable of working under any and every type of weather conditions, ranging from superlative heat to extreme cold. That the aircraft are capable of these arduous undertakings is proved by the record of the company. This record, however, would not, perhaps, exist were it not for the splendid efficiency of the workshop and mechanics of the Airways in Windhoek, who maintain the aircraft and carry out to the best of their ability the desires of the manufacturers. The record of the Airways shows to what extent these desires are fulfilled. The all-metal Junkers planes appear to be particularly suitable for this country, especially in view of the fact that where planes remain overnight at Windhoek there are no hangar facilities, necessitating their remaining out in all manner of weather.

Without depreciating in any way the excellent work of the Junkers machines, it is gratifying to note that they are fitted with British engines—Armstrong-Siddeley—and a great measure of the success of the Airways is due to them, because were it not for the wonderful service given by the engines the record could under no circumstances be the 100 per cent. efficiency that it is.

Occasionally one hears complaints that the air mail service is an unnecessary extravagance for South West Africa, but apart from the fact that it has on many occasions been amply proved that the air mail service is essential for the progress of the country, the increased patronage which the air mail service is securing by reason of the benefits it provides for the commercial community and the administration is sufficient evidence for the necessity of an air mail service from Windhoek to Kimberley to link up each week with Imperial Airways' service from London to Cape Town.

Retractable Undercarriages for K.L.M.

THE K.L.M. are about to embark on an interesting experiment in the way of trying out retractable undercarriages in service on their air lines. In making this experiment we understand that they are not making any extravagant promises of success, but they consider that the prospects of an increase in speed, by abolishing the drag set up by an undercarriage, are such as to deserve a practical study in operation.

Accordingly two new types have been designed for the K.L.M. by the Fokker Company in Holland, and are now under construction. One of these will be known as the F.20, which will be a cleaned-up version of the F.18. It will be driven by three Pratt & Whitney "Wasps," and on European services will carry 16 passengers and a crew of two. On the Amsterdam-Batavia service the passenger seating will be reduced, but passengers will be provided with long lounge chairs in which they will be able to sleep. The crew will consist of four, and, of course, there will be ample accommodation for mails. If this F.20 comes up to expectations, it is hoped that the extra speed given by the removal of the undercarriage drag will enable the schedule of the Eastern service to be reduced from its present time of eight days in summer and nine days in winter to a journey time of only six days.

The second new type is a larger machine with four engines, to be known as the F.36, which is to carry some 30 passengers. At the moment there would seem to be no need for such a large machine, but air transport is now growing so rapidly in importance that the K.L.M. have decided to take the long view and to be prepared for a large increase in traffic.

The K.L.M. are to be congratulated on their enterprise in putting this interesting problem to the test of practice, and the performance of these two new machines will be watched with very great interest.

Hillman Airways, Ltd.

HILLMAN AIRWAYS will shortly be operating a new air service from Romford Aerodrome to Ramsgate; a party of the Ramsgate Town Council will fly in the new D.H. "Dragon Moth" *Maylands* from Ramsgate to Romford at 1 p.m. on Tuesday to discuss the matter. The aerodrome at Ramsgate adjoins the Manston Aerodrome, but later a different site will be selected to serve Ramsgate, Margate and Broadstairs. Mr. William Courtenay, of Aviation Publicity Service (8, New Court, W.C.2, and Grosvenor House, S.W.1) will look after Hillman's interest during 1933. Mr. Courtenay organised the Essex Aviation Display last September, and will make arrangements for the opening of the new Ramsgate air service.

From the Clubs

NATIONAL FLYING SERVICES, HANWORTH

On Sunday, January 8, the instructors were kept busy the whole day giving dual instruction. On Monday, Capt. Max Findlay, with Capt. Chambers, left Hanworth in G-ABAF for Le Bourget, returning on Wednesday in very bad weather, and landing at Hanworth in a thick mist. Mr. Addinsell, of the Canadian Air Survey Co., has joined the Club and commenced dual with an "A" licence in view. Cadet Soman has carried out his "A" licence tests and leaves Hanworth on Saturday for the West Indies. Mrs. Jenkinson has also completed her tests for an "A" licence on the Autogiro. On Tuesday afternoon there was a very successful children's party, over 50 children being present.

MAIDSTONE AERO CLUB

On Thursday, January 12, the Club held its first annual general meeting, which was well attended, and the progress of the Club during the past year was much praised. The Club has now been running for six months, 336 hr. have been flown, which have resulted in six soloists and four "A" licences. The membership numbers 130. The social activities of the Club have been a great success, especially the annual dance and the monthly "At Homes." On Sunday, January 15, there was a Clay Pigeon Shoot Competition for those under 18, and on Sunday, January 22, the Club will hold a Scavenger Hunt. At the annual general meeting Sir Robert Gower, M.P., J.P., O.B.E., and Lady Bailey were elected Honorary Wardens of the Club, Mr. C. H. Lowe-Wylde Club Captain, Mr. Michael Sassoon Vice-Captain, and Mr. K. Barcham Green Chairman of the Committee.

BRISTOL AND WESSEX AEROPLANE CLUB

The number of hours flown during 1932 was slightly less than during 1931, although the Club membership has remained constant. Fifteen pupils completed their training for "A" licences, but with those under training the number should exceed 20 by the end of the Club's financial year. In the early part of last summer the Club purchased two new "Gipsy Moths," which have standardised the equipment with this type of machine. Two flying scholarships which have been given by the Bristol Club were won by Capt. R. Hazzledine and Mr. R. Henning Turner, both of whom secured their pilot's licence before the end of August.

THE AIRCRAFT CLUB, HARROGATE

Thanks to the efforts of Mr. J. N. Gladish, an old war pilot and member of the Club, permission has been obtained to use an aerodrome not far distant. Maj. Hills, the Club's President, is fighting at the Air Ministry to get removed restrictions which prevent the use and development of low-powered aircraft. To the north and north-west of Harrogate are hundreds of square miles with neither habitation nor crops. How, therefore, can members cause risk to third parties in this area? What the Club desire is low-powered aircraft which will halve the cost of learning to fly. The glider and sailplane at present being built in the Club should be out by March, when the constructional section will be able to undertake new work. The annual general meeting will be held in the clubroom on Friday, January 20, at 8 p.m., and all who would like to join are cordially invited to attend.

BROOKLANDS

The aerodrome has been afflicted with fog and cold weather, but work has proceeded steadily whenever possible. Mr. Opie, who has been doing most of his instruction before 9 a.m., has done his height test and completed the 3-hr. solo necessary for his "A" licence. Those who have seen him take off at 8.30 on a really frosty morning will agree that he has earned his "ticket." Mr. Walker has brought a "Moth," a "Puss Moth" and a "Swift" to house at Brooklands. He evidently believes in variety when flying. Mr. Parrish has purchased a Comper "Swift" and has been flying it round Brooklands, and Lt. Bentley has visited the aerodrome also in a "Swift." The new snack bar has proved a great asset and is well patronised. The *Brooklands Aerodrome Magazine* has now been adopted by the Brooklands Racing Club, so now it is the official organ of the Brooklands Automobile Racing Club, the Brooklands Aero Club, the Brooklands School of Flying, the College of Aeronautical Engineering and the Cinque Ports Flying Club. A prize of 5 guineas is offered for a front cover design of this magazine. Details of the 1933 programme are not quite completed, but it is hoped that a system of "rationalisation" will be developed, by which is meant the efficient running in the best way possible from the economic point of view.

LONDON AEROPLANE CLUB

The London Aeroplane Club are now ready to continue blind flying instruction, a machine having lately been fitted up with the latest instruments from Reid & Sigrist, Ltd.

SURREY AERO CLUB

During the week the Clay Pigeon Shooting season was opened at Gatwick with a Special Invitation Shoot, when the members of the Clay Pigeon Association were the guests of the Surrey Aero Club. The weather was not favourable, but the meeting was a great success. The Line Sweepstake was won by Mr. W. M. Hamilton, who scored 39 hits out of a possible 40 and Mr. A. G. Hall won second prize. The Gatwick Aerodrome Challenge Cup was won by Maj. Northover. There then followed a Special Handicap, in which the special targets, when hit, released a coloured balloon which had to fall within prescribed limits. Mr. Duncan was the winner, Mr. F. Dance came in second, Maj. Northover third and Mr. C. B. Bass fourth. In the final Mr. A. G. Hall came in first.

WHERE REPAIRS ARE DONE: The repair shop at Heston Airport where the staff of Airwork, Ltd., carry out repairs and overhauls to all kinds of aircraft.

Messrs. Lucas and C. B. Bass second and third. In the fourth event there was a tie between Messrs. Duncan, Shorthouse, Lucas, Bass and Crumpler, so a re-shoot took place in which Mr. Bass was the victor.

HULL AERO CLUB, N.F.S.

The Club are commencing 1933 with a very full and live month. Two "Club Nights" will be held on January 24 and 28, the dance band being in attendance as usual. On Thursday, January 12, at 8 p.m., there was given a lecture by a representative of Armstrong-Siddeley, Ltd., and on January 19, also at 8 p.m., a lantern lecture will be given by Mr. G. O. Waters, Station Superintendent at Croydon of Imperial Airways, Ltd. The year 1932 has been particularly progressive, due to the efforts and hard work of the Chairman, the Committee and a number of enthusiastic members. The Club has been put on its feet very successfully, but that does not mean that it is time to slacken; the Club cannot climb by itself, and it is hoped that every member will take a hand in making the New Year even more successful than the old.

THE "TICKET-OF-LEAVE" FLIGHT

On Sunday last Heston had almost the manner of a quiet summer week-end, since many foregathered to see the swarm of locusts (with great respect) arrive from Hanworth on their first cross-country. They were preceded, as of honour, by a formation of four Autogiros, or, according to a recent Air Ministry mandate, gyroplanes, flown as to ABXB by Brie, ABVF by Field Richards, ABUC by McMullen, and ABUD by Rushton, we believe. The above-referred-to mandate, by the way, should revive jokes of the order of "Why does a mouse when it spins?," for it clearly defines an aircraft in a spin as a "gyroplane." Really this official interference with auto-rotation must cease. Just after the official zero hour (13.00) a high-pitched buzz reminiscent of Brooklands on motor cycle day penetrated the rain up-wind, and a very good formation of four entirely unairworthy and structurally deficient, centre-of-gravity-less, impossible and "ticket-of-leave" aeroplanes descended upon us. That, by the way, is not so much journalese as Official View. The Lowe-Wylde men were upon us. And their attack on preconceived ideas was a robust one. They circled the aerodrome strongly and then flew down to land perfectly in formation, just like other aeroplanes. They did not break up or tip over in spite of a stiff (wet) breeze with gusts up to 20 m.p.h. or so. Having landed fourth, Lowe-Wylde himself turned around and took off quite nonchalantly down-wind and gave us a low wild demonstration of crazy-flying which would have warmed hearts at Hendon any year. The remainder of the formation, namely Ayre, Andrews and Longmore, drew up into line and parked for the lunch provided. Lowe-Wylde then landed and stopped in rather less than 25 yards in the lee of the sheds, and joined his fellow-tourists in their "raid." The day was a foul one for flying. The demonstration was complete and convincing. All that remains is to invent the right name for "ticket-of-leave" aircraft. The nail was driven even more firmly home by a formation take-off "when Nanny came for the children" at 14.30 hr.

THE BRITISH GLIDING ASSOCIATION, LTD.

The annual general meeting of the British Gliding Association, Ltd., will be held in the library of the Royal Aeronautical Society, 7, Albemarle Street, W.1, on Monday, February 20, at 7.30 p.m., for the following purposes:—

(1) To receive and consider the annual statement of accounts and balance sheet of the Association.
(2) To elect the following for 1933:—
  (*a*) The Council.
  (*b*) The President and Vice-President.
  (*c*) Chairman and Treasurer.
(3) To appoint the Honorary Auditor.
(4) To appoint the Honorary Solicitor.
(5) To appoint Stewards.

Nominations to the Council, which must be signed by the candidate and two members, must be received by the Secretary before January 23, 1933.

MONTREAL LIGHT AEROPLANE CLUB

The annual general meeting of the Montreal Light Aeroplane Club was held lately, H. Perodeau presiding. The future policy of the club was discussed at some length in view of the fact that a heavy financial loss had to be faced. It was proposed that the club should be re-organised on a basis of 50 members, guaranteeing 50 flying hours a month, with annual dues of $50 per member. It was also suggested that winter flying be discontinued entirely, as in the past it had not proved sufficiently popular.

Viceroy's Cup Air Race

The annual air race for the Viceroy's Challenge Cup will be held at Delhi on February 10. The regulations and entry forms controlling the race have been sent to all the Flying Clubs in India and Burma. The race will be open to all pilots, but a special prize will be awarded to the first "A" licensed pilot trained in India to pass the winning post. The race is open to any type of *bona-fide* civil aircraft, but an owner of any aircraft not manufactured in the British Empire must supply the maker's performance figures. In a multi-seater craft one passenger must be carried. The course will be 691 miles, starting and finishing at the civil aerodrome in New Delhi, and must be completed by 6 in the evening on the day of the race. The course will be New Delhi, Bareilly, Lucknow, Agra, Rangpur and New Delhi. Compulsory stops of 45 minutes must be made at all these aerodromes. The race this year will be a handicap-speed race.

Merseyside Aviation Display

ARRANGEMENTS for an air pageant at Speke Aerodrome, Liverpool, are now being made on behalf of the Liverpool Corporation. Sir Max Muspratt has been in consultation with Mr. William Courtenay, whom the Corporation will retain to organise the pageant. It is hoped that it will coincide with the official opening of the aerodrome, when the first portion of the hangars will be ready at Whitsun. The pageant is to be known as the Merseyside Aviation Display, with a view to drawing support from the surrounding boroughs. The general aim will be to make it the finest civil air pageant of the year, and the Air Ministry is to be approached to secure R.A.F. support.

A Study in Silence

IF "silence be golden" it is evident that most modern aircraft have come off the gold standard. Sir John Carden has interested himself in the noise problem in relation to private aircraft, and as a result has, with a very little trouble, a "Klemm" which is so quiet that on a windy day it is doubtful if it could be heard overhead at 250 ft. The modification goes to show what could be done in this direction by the adoption of common-sense. He has a four-bladed wooden screw on his "Pobjoy," the acoustic merits of which are already familiar, and an interesting exhaust pipe comprising a double or Y manifold leading into a single pipe beneath the fuselage, incorporating a Burgess silencer. This device is, in effect, a closed very slightly tapered sleeve of about 3¾ in. max. dia. and 4 ft. length, surrounding a finely perforated straight-through pipe. The annular space between the pipe proper and the sleeve is packed with steel-wool. The exhaust noise when running-up on the ground is about that of any standard 9-h.p. car. That there is no back-pressure seems obvious, because there is the usual unobstructed exit for the gases. Presumably, therefore, the principle is fundamentally that of the elastic-walled chamber known to physicists. The residual noise in flight is so slight as to be recognisable in nature, as being a compound of gear and tappet noise, and air-screw noise: like a sewing machine and a steam-jet going off together.

G.A.P.A.N. Officers for 1933

AT the Court Meeting following the Annual General Meeting of the Guild held recently, the following officers were elected for 1932-33:—

Master: Capt. The Rt. Hon. F. E. Guest.
Deputy Master: The Marquis of Douglas and Clydesdale.
Wardens: R. A. de Haga Haig; E. H. Lawford; N. Macmillan; J. B. Cordes.

The remaining members of the Court are as follows:—V. H. Baker, R. A. C. Brie, G. Birkett, G. M. Cox, E. H. Fielden, M. H. Findlay, H. F. Jenkins, O. P. Jones, G. P. Olley, H. H. Perry, C. A. Pike, R. H. Stocken, H. G. Travers, A. S. Wilcockson.

Hon. Members: Col. the Master of Sempill; F. Tymms.
Chaplain: Rev. D. P. Robins.

Airport News

CROYDON

LORD LONDONDERRY, Secretary of State for Air, left Croydon in the African air mail liner on Wednesday, January 11, accompanied by his private secretary, Mr. L. G. S. Reynolds. Lady Londonderry and a number of friends and officials, including Sir Philip Sassoon, Under Secretary of State for Air, and Col. Shelmerdine, Director of Civil Aviation, were gathered at the airport to bid farewell to Lord Londonderry.

Lord Londonderry will leave the air liner at Alexandria, and will continue by means of service aircraft an inspection of R.A.F. units in Egypt, Palestine and Iraq. On the first stage of his journey to Paris, Lord Londonderry passed the air liner in which Sir John Simon was returning from the South of France.

There was much fog on the air routes during the same day, and a Belgian air liner bound for Croydon had a narrow escape from disaster while flying in the vicinity of Gatwick and Redhill. The pilot descended through thick fog in order to find landmarks to guide him along the Redhill Valley, when suddenly he saw a tree directly in front of the plane. He immediately began to ascend, but could not avoid the machine striking the top of the tree and tearing a rent about seven feet long in the fabric at the bottom of the fuselage. Undoubtedly, the prompt action of the pilot averted what might have been a serious accident. The mishap, however, was not sufficient to impede the journey of the air liner, which arrived safely at Croydon, despite a dense fog, with its nine passengers, none of whom suffered any injury.

Acting on advice received by wireless from Croydon, the pilot of a Dutch air liner (later the same day) landed owing to fog at Eastchurch, the passengers continuing the journey to London by road.

Fog continued throughout the rest of the week, and on Friday a number of air liners were delayed. Some were forced to land at Lympne, and several services were cancelled.

The pilot of an Air Union air liner, while flying from Paris to London, noticed a defect in one of the engines of his machine, which was back-firing excessively. He immediately put down and made a safe landing. The fire rapidly spread from the engine to the fuselage, which was quickly enveloped in flames. The passengers and crew made a hurried exit from the cabin, and the pilot, M. Corsin, made valiant but unsuccessful attempts to extinguish the fire. All stood by while the petrol tanks exploded, and in ten minutes the machine was burnt out. At the time of the outbreak of the fire the plane was flying over a lonely part of the Poix district, several miles from the nearest village; consequently there was some difficulty in obtaining details of the mishap, but it was soon learnt that no injury was suffered by the crew or the three passengers, who returned to Paris, where they spent the night and made the journey by air to Croydon the next day.

Lord Londonderry photographed with his daughter, Lady Mary Stewart, at Croydon before leaving for his tour of inspection of R.A.F. Units in Egypt, Palestine and Iraq.

Lady Bailey, who is attempting to beat Mrs. Mollison's record of 4 days 6 hr. 56 min. from London to Cape Town, left Croydon at 2.35 a.m. on Sunday. For eight days Lady Bailey had been waiting for the weather conditions in France to improve. On Saturday there was a favourable change and a three-quarter moon. It was after receiving the weather report at 9.30 p.m. on Saturday that Lady Bailey decided to start. Except for the night duty officer and a few men on the night staff, there was no one at Croydon to see her off. Unlike the machines of other famous flyers, Lady Bailey's "Puss Moth", bears no name, and is only known by the registration letters (G-AAYA). Her plane, which is fitted with an extra petrol tank in the cabin, carries a load of 130 gallons of petrol, sufficient to last for twenty hours. Everything had been done to save weight. No wireless equipment and no navigation lights had been fitted, not even a dash light to enable her to see the instruments at night, thus avoiding the necessity of carrying heavy batteries for accumulators.

Two Air Union air liners were used to convey Roy Fox and 22 of his bandsmen to Paris on Sunday morning at 7.30 a.m. They played on Saturday night in London and broadcast on Sunday afternoon in Paris.

The total number of passengers for the week was 957; freight, 46 tons 14 cwt.

HORATIUS.

THE GALWAY SCHEME

Two and a Half Million Pounds Sea and Air Port

PLANS for the establishment of a sea and air port, costing approximately £2,500,000, at Furbough, on the northern shores of Galway Bay, are being prepared by the Irish Trans-Atlantic Corporation.

Already the interest of the Governments of the United Kingdom, the Irish Free State, Canada and Newfoundland has been secured, and at the Ottawa Conference last year a committee was appointed to investigate the possibilities of such a scheme. The committee has now reported to the Governments concerned and it is understood that they recognise the "key" position of the Irish Free State in any scheme for the speeding-up of transport between the European and American continents across the North Atlantic Ocean.

Continental and American financial firms have displayed considerable interest in the proposals of the Corporation and representatives of a powerful German group are to visit Dublin within the next week. At the same time the constitution of the Corporation is such that the controlling interests must remain in the hands of Irish Free State citizens.

Mr. Maxwell Ayrton, who acted as architect to the

British Empire Exhibition at Wembley, is architect to the organisation and has already submitted two preliminary reports, in which he recommends the site at Furbough as being eminently suitable for the sea and air port, subject to the opinion of Sir Alan Cobham, who has been appointed aviation consultant. It is understood that Sir Alan will make the air survey early in February.

Mr. C. H. Clendining, managing director of the Irish Trans-Atlantic Corporation, has already discussed the plans with Col. Shelmerdine, Director of Civil Aviation, and other representatives of the Air Ministry, and also with the Free State Minister for Industry and Commerce and the Director of Transport and Marine in that country. After Sir Alan Cobham has visited Furbough, Mr. Clendining is to sail for New York, where he will discuss further financial aspects of the scheme.

It is planned to build a long breakwater out into Galway Bay to form a harbour capable of accommodating the largest ships afloat. This harbour will be dredged by sand-pumping and the sand utilised to cover the area which it is proposed to make the airport; this is at present in a very marshy condition.

Halifax will form the terminal port of the scheme on the American continent and the liner service will sail from that port to Galway, from where passengers and freight will be conveyed by air to the European capitals. Very low harbour dues are to be charged at the new port with the object of attracting the steamship companies to withdraw their present business from the ports of Liverpool and Southampton, where the harbourage dues are exceedingly heavy.

The Galway Harbour Commissioners are interesting themselves in the scheme, which will probably be commenced within the next six months, but in the meantime they are taking over the old military aerodrome at Oranmore, six miles east of Galway, for use as a municipal aerodrome which is included in a scheme of development for which they are seeking parliamentary approval.

Galway Airport and Germany

HERR HAFELS, representing the Demag Company, of Duisburg, Germany, a well-known firm of constructional engineers, visited Dublin last week and had a long conference with the directors of the Irish Trans-Atlantic Corporation with regard to the proposed sea and air port at Furbough on the shores of Galway Bay. It was decided at the conference that the Demag Company should send technical experts to inspect the site, after Sir Alan Cobham's visit next month.

Bristol Airport

THE four primary services at any civil aerodrome, *i.e.*, flying club, sales, service and maintenance and air taxi work, were well established at the Bristol Airport at the beginning of 1932, and maintained more than satisfactory progress throughout the year. 1932 also brought two new developments. The airport was approved for Customs clearance, and in July an experimental air-ferry service between Bristol and Cardiff was operated by Capt. C. D. Barnard with the "Spider." The success of this experiment resulted in the regular Bristol-Cardiff service, which is now run by Norman Edgar & Co., and which has justified its operation during the worst period of the year. This venture, coupled with a new air-taxi business organised by the same firm, provides regular employment for two additional "B" licensed pilots. Visiting aircraft and fare-paying passengers using the airport show an increase of over 50 per cent. on the previous year. There was no startling development in private ownership, although the number of members of the Club owning their own machines increased from seven to nine.

An Aerodrome on the Madras-Colombo Route

IN anticipation of the extension of the Imperial Air Mail service from Madras to Colombo, Raja Sir Annamalai Chettiar has offered an aerodrome at Kanadukathan. This place lies almost midway on the shortest route between Madras and Colombo. The Raja has already spent Rs. 10,000 on converting about 100 acres of forest land into a landing ground. Hangars for housing two or three aeroplanes will be constructed and will be equipped for carrying out repairs. The cost of the whole scheme is expected to be about Rs. 30,000, which will be defrayed by the Raja. Raja Sir A. Chettiar is a great flying enthusiast and it is understood he intends shortly to acquire an aeroplane for his own use.

Gravesend and "Castle Adamant"

GRAVESEND Town Council are seeking the Air Ministry's opinion. (Several people would like to know in which department the Air Ministry files away its opinions; probably mixed up with the files of facts. Or are they just left in the "pending" tray?) Gravesend wants a seaplane base for commercial use, but the Air Ministry have told them to find a lake one mile long and one mile wide. Now a lake is an expanse of water entirely surrounded by land, so the Gravesend Council, who had been casting longing eyes at Father Thames, were obliged to think again. However, they have not given up hope, and are again making representations to the Ministry. Gravesend already has an aerodrome licensed as an airport, and run by the Gravesend Aviation Co., Ltd., but, being ambitious, they also feel that a seaplane base would be of great commercial value.

An Airport for Leicester

"WHATEVER economies may be forced on the City Council by the Government, the scheme for an aerodrome should not be put on one side. Leicester *must* have an airport or we shall find our rival towns years ahead of us in air transport development." So spoke the late Councillor Herbert Simpson in a last interview with a local newspaper representative, and it would appear that his words carried weight, for on the evening of January 9 the Parliamentary and General Purposes Committee decided to recommend the City Council to proceed with the establishment of a municipal aerodrome at Braunstone. So Leicester is to join the select band of cities who have had the forethought to provide their citizens with an airport. The estimated cost of Leicester's airport is £15,000. The site will cost £7,000, the lay-out £6,000, and the buildings £2,000, and what will interest the citizens of Leicester most, the burden to the ratepayer will be negligible, for, until revenue is coming from the airport, the cost to the rates will not be more than £1,000 a year.

Mr. W. Lindsay Everard, M.P., has made it clear on behalf of the Leicestershire Aero Club, that if the municipal aerodrome is ready within a reasonable space of time, the club would welcome the opportunity to move there from Desford.

Air Transport in Ulster

A GROUP of Belfast business men are considering the founding of an air taxi service for Northern Ireland which will bring any point in Ulster within one hour's journey from their city. It is proposed that three machines be purchased, one for use in Northern Ireland, the second for flights to England or the Irish Free State, while the third is maintained for emergencies.

THE LATE MISS WINIFRED SPOONER.

(*See page* 61.)

The following messages of condolences have been received by the Royal Aero Club:—

"The news of the death of the valorous aviatrix, Miss Spooner, deeply grieves myself and Italian pilots (stop) Sincere sympathy."

GENERAL BALBO.

"I wish to convey Aero Club of Italy's, and my own personal, expressions of sincere sympathy at death of unforgettable Miss Spooner, whose valour at the side of our aviators was greatly appreciated."

DIAZ DELL VITTORIA
(President, Aero Club of Italy).

"We are deeply moved by the death of Miss Spooner, who is highly esteemed in Germany, and we wish to express our sincere sympathy with her relations."

AERO CLUB OF GERMANY.

Airisms from the Four Winds

Sqd. Ldr. Hinkler

No news has been received of Sqd. Ldr. Hinkler, though it is reported that a monoplane was seen flying over the Canton Valais in Switzerland on January 7, the day he left England. Hinkler has now been missing for 11 days, and it is to be feared that something very serious must have happened, but there is always the hope that he has come down in some out-of-the-way region where communication with the outside world would take many days. For instance, if Hinkler came down in the Alps, where there are large stretches of country with a population of under 26 persons to the square mile, he might conceivably be missing for a fortnight. There is also another possibility which seems to have been ignored; on the day of Hinkler's departure the weather over Germany, Austria and the Balkans provided better flying conditions than did the weather over France, Italy and the Adriatic, so it is possible that Hinkler may have headed for Athens on that route, and supposing he had then forced landed in the Balkans, where the population is under 100 to the square mile, the people entirely of the peasant class, and railway stations and post offices far apart, he may still be about somewhere, perhaps slightly injured, lying-up in some homestead. If Hinkler is really lost, it cannot be entirely ruled out as a possibility that he came down in the Channel. He might well have been flying low in his heavily loaded machine. Turning to the forced landing question, it seems unlikely that a pilot of Hinkler's ability and resource would come to grief even in the worst country. Capt. Hope, who is searching the Alps with Basle as headquarters, and others who may assist him in the search, will carry the good wishes of everyone to whom the loss of "Bert" would be a serious blow.

Girl Cape Flyers Come to Grief

MISS JOAN PAGE and MISS AUDREY SALE-BARKER, who were on a return flight from the Cape, left Moshi in Tanganyika on January 14. After being long overdue at Nairobi a search was organised, and on January 16 a wrecked aeroplane was seen by Capt. Tanner, lying on its back, very much smashed up, about 15 miles north of Lake Magadi. One girl was seen standing beside the wreck, but there was no sign of the other. Two machines and a car convoy immediately set out. It appears that the two girls left Moshi in bad weather following an air mail machine; the pilot of the latter decided to turn back, the conditions getting worse, but Miss Page and Miss Sale-Barker carried on.

Lady Bailey's Attempt on the Cape Record

IN her attempt to beat Mrs. J. A. Mollison's record flight to the Cape of 4 days 6 hr. 56 min., Lady Bailey made an excellent start on January 15. Leaving Croydon Aerodrome in her "Puss Moth" ("Gipsy Major" 130 h.p.) at 2.40 a.m. she landed 1,100 miles away at Oran, in Algeria, practically 13 hr. later, at 3.50 p.m. She had actually reached Oran and circled over it about three hours before, and then continued southwards, hoping to take advantage of the daylight that was still left and reach Colomb Bechar. Unfortunately, bad weather and fatigue overcame her when she had reached Ain Sefra, and wisely she decided to return to Oran for a rest. On her arrival there she was examined by a doctor, who announced that she showed the symptoms of influenza. Nevertheless, that evening at 9.50, Lady Bailey, still suffering a slight temperature, continued her flight, but up to the time of writing no further news of her progress has been received. Although her route to Oran was longer by the distance from Croydon to Lympne, Lady Bailey had improved on Mrs. Mollison's time by about 1¾ hr.

French Flight to South America

Two French airmen, Mermoz and Mailloux, left Istres Aerodrome, Marseilles, on the morning of January 12 flying the Couzinet monoplane *Arc-en-Ciel*. The machine is powered with three 650-h.p. Hispano-Suiza engines, has a total weight of about 14½ tons, carries 1,891 gall. of petrol and is said to be capable of a speed of 170 miles/hr. Their destination was Saint Louis, French West Africa (2,687 miles), thence across the South Atlantic to Natal, Rio de Janeiro and Buenos Aires. They reached Port Natal from Saint Louis in the evening of January 16, the 2,000 miles across the Atlantic being covered in 14 hr.

New French Airship

THE new French airship E.9, built for the French Navy by the Zodiac concern, made a successful trial flight on January 10. This semi-rigid airship is driven by two 350-h.p. engines, has a capacity of 10,000 cubic metres and carries 11 passengers. It was piloted by M. Debroutille, the company's chief pilot.

The "Southern Cross" Crosses Again

SIR CHARLES KINGSFORD-SMITH arrived at New Plymouth in the *Southern Cross* on January 11, having flown from Gerringong Beach, near Sydney, in 14 hr. 15 min. The flight of 1,200 miles was made in excellent conditions, and the only troubles experienced were slight ones with the oil and petrol pumps. Sir Charles was accompanied by a crew of four, and he broadcast all the way across for the Australian people to follow. This is the second time he has crossed the Tasman Sea in the *Southern Cross*, and, as usual, Sir Charles reduced the element of risk to its lowest by careful preparations.

Duke of Gloucester in Africa

THE Duke of Gloucester left Khartoum by R.A.F. machine on Thursday, January 12. After spending a night with the Governor at Malakal, the Duke will proceed by air to Juba, and thence by car to his camp at Thirippi. It was announced by the War Office recently that the Duke of Gloucester had passed his examination for promotion.

Lady Bailey's D.H. "Puss Moth" in which she set out from Croydon on January 15 in an attempt to beat Mrs. Mollison's record for a flight to the Cape. (FLIGHT *Photo.*)

R.A.F. FITTERS AND MATES

BY the introduction of the new scheme of organisation in the Order A.364—a summary of which was published in our issue of January 5 last—the Air Ministry has once again demonstrated the keen interest it takes in the welfare of all ranks serving in the Royal Air Force, for, though there is much just and fair criticism that can be levelled at the drastic changes which are to take place in matters affecting the careers of airmen, yet it is gratifying to note that on the whole these changes are designed primarily for the assistance of airmen, without in any way diminishing the efficiency of their work. The changes in general outline are clear enough. In the past there have been allocated to each machine one fitter and one rigger, who might be any rank in their trade from Corporal downwards, each having his own responsibility in the upkeep of his particular machine. In the future each machine will be under the supervision of one man, who will be called a "Fitter, Grade II," and will be by trade both a fitter and a rigger, and he will be assisted by one man, styled a "Mate," who will be drawn from aircraft hands but will not be regarded as accepting any responsibility. After a period of not less than three years in flights the Fitter Grade II may be promoted to Fitter Grade I, and will then be posted to workshops, where he will also be assisted by a Mate.

The periods of training for these new ranks have only been fixed provisionally. In the first instance Fitters II will be trained at Halton over a period of three years. The advanced course for promotion to Fitter I (probably of one year's duration) will also take place at Halton. The length and location of training for Mates have not yet been decided.

Airmen pilots can only be selected from Fitters Grade II, and will be barred from upgrading during their service as pilots. In order to leave the N.C.O. fitters in flights more free to exercise technical supervision, one aircraftman (aircraft hand) in each flight will be promoted to Corporal. The rank of Warrant Officer, Class II, will be abolished throughout the Service.

Engagement in the Reserve for four years will be offered to ex-apprentice airmen discharged on or after January 1, 1933, on satisfactory completion of their initial engagement. Airmen who enter into such an engagement will be entitled to a gratuity of £100 in place of the ordinary discharge gratuity of £1 for every year of service. During the first three years of their Reserve service no training will be required, but in the fourth year they will be liable for training at current rates of Reserve pay.

One of the reasons given for the change first enumerated above is the decrease in work caused by the greater reliability of modern engines, and by metal supplanting wood in airframe construction.

As regards effect on personnel, no one seems to be any worse off. The number of men, and consequently the amount of physical working power, employed on each machine remains the same. The Fitter II under the new system, it is true, will combine the responsibilities of the fitter and rigger under the old system, but this he will be well able to bear on his capable shoulders, or should one say in his capable brain, and he cannot but appreciate the added confidence which is being placed in him. The aircrafthand will also be in an improved position, for now he will have definite work, instead of being only employed on such heterogeneous jobs as batman, sanitary orderly, trumpeter, telephone operator, messenger, etc. The aircrafthand in the past has looked with longing eyes on the powerful engine, and the graceful lines of the shiny wings and fuselage, with envy in his heart for the lucky ones who are allowed to cover themselves with oil and paint in an earnest endeavour to keep their charge spick and span, ready to take the air at the call of duty. Now has the dream of the aircrafthands come true, and they will be able to caress the glistening monster with their own hands. Financially the aircrafthand will be better off by 3d. a day. The Air Ministry will in future take steps to prevent a surplus growing up in any particular rank, which would retard promotion of many well fitted to receive it, by only allowing airmen to re-engage when there is a definite chance of their ability receiving deserved recognition. The Air Ministry further promises that so far as is possible all suitable L.A.C.'s will be promoted to Corporal during their initial period of engagement, the majority of Corporals will be promoted to Sergeants, and of the restricted number of Sergeants selected for re-engagement, a majority will be promoted to Flight Sergeants. There is, however, one point of adverse criticism which must be raised here. All Fitters I will be employed in squadron workshops and, presumably, in depôt workshops; in other words, the best brains and most skilled hands will be utilised in construction rather than in maintenance. But it is essentially in maintenance, in the work done in flights, that there occur the minor troubles which are of great import, need such careful consideration and such delicate work, and so often result in very useful modifications. Turning to a more personal aspect of the question, one of the main reasons why Great Britain can boast the most efficient air service in the world is the absolute confidence which the men of the flights inspire in the pilots who fly the machines, and it does seem possible that this magnificent spirit may be diminished by removing from the flights the most competent men. The abolition of the rank W.O. II will be regretted by none. When there is only one rank of Sergeant, and one rank of Flight Sergeant, it is an unnecessary complication to introduce two ranks of Sergeant Major. It is quite a sound idea to remove from the Flight Sergeant as much disciplinary work as is possible, for a Flight Sergeant is essentially a technical man, but the Corporals will have to be chosen with great discrimination, for their job will be no sinecure.

Then there is the new policy of men transferred to the Reserve. The Air Ministry has evidently decided that in view of armament cuts, improvement in the Reserve is excellent compensation, so a gratuity of £100 is being offered to airmen who will promise to adhere to certain conditions which are far from exacting. A generous offer indeed, and let not the bigot sneer "Timeo Danaos et dona feventes," for this is no treacherous Wooden Horse which the Air Ministry is pushing through the portals of Change into the fair land of Improvement. The gratuity is not entirely an enticement, but also the result of a genuine desire to assist men in finding decent employment after they have left the Air Force, having given valuable years of their life in its service. And let it be added here that in finding civilian employment, a man who is a fitter-rigger trained in the Service (and what better training could there be?) stands a better chance than does one who has only been trained in one of these trades. Haunting every line of the Air Ministry report is the spectre "Economy," but in that they have succeeded in satisfying the demands of the ghost, without in any way impairing the health of the Air Force, but rather improving the general prospects of all concerned, the Air Ministry are to be congratulated.

THE HIMALAYAN FLIGHT

THE Air Ministry has issued the following notes on the flight of five Hawker "Hart" aircraft from No. 2 (Indian) Wing, Royal Air Force, Risalpur, a photograph concerning which was published in our issue for January 5 last.

A formation flight of five "Hart" aircraft from No. 2 (Indian) Wing, under the leadership of Flt. Lt. F. H. Isaac, D.F.C., left Risalpur on October 17, 1932, for Gilgit, where they arrived the same morning. Three nights were spent at this station, and the flight returned to Risalpur on October 20. The Hawker "Hart" aircraft were fitted with Rolls-Royce ("Kestrel") engines.

After leaving Risalpur at 0820 hours the flight headed for Shang, which was passed at 0930 hours at a height of 10,000 ft. The aircraft then flew up the Indus Valley, attaining as direct a course as the height of the mountains would permit, to Jalkot and Bandazasin. Owing to increasing cloud above 10,000 ft. it was decided to keep just below this height, in order to see the weather ahead.

On turning eastward along the Indus Valley from

Bandazasin towards Chilas, the valley widens and no further trouble was feared with regard to weather conditions. Broken clouds were on each side of the mountains up to 17,000 ft., but the valley was clear. The aircraft flew over Mount Chilas at a height of 10,000 ft. at 1000 hours and Bungi was passed at 1023 hours. The flight landed at Gilgit at 1040 hours, having taken about 2 hr. 20 min. to do a distance of nearly 300 miles.

On landing the flight was met by Maj. Gillan, the Political Agent at Gilgit, and by the Mir of Nagir and his followers, who not only took great interest in the aircraft, but recognised them as a different type from those which visited Gilgit the previous year. (This was a flight of Westland "Wapitis" which made a flight to Gilgit in March, 1931.)

The local populace, to the number of six or seven hundred, were also present and showed great enthusiasm.

During the stay of the flight at Gilgit a guard was provided by the 3rd Brigade, Kashmir State Forces.

While the aircraft were at Gilgit flights were undertaken to Hunza and Nagir and over the Punial district. Two of the aircraft took part in the flight to Hunza and Nagir. They flew in formation up the Hunza River, passing the mountain Rakaposhi, 25,550 ft., to the eastward. Beyond Nomal the gorge over which the aircraft flew narrowed very considerably as Chalt was approached. Chalt was passed with the aircraft flying at 10,000 ft. Beyond this the valley widens, and the north side of Rakaposhi is a magnificent sight, rising steeply up from the valley bed, which is approximately 6,500 ft., to its peak at 25,550 ft. There are glaciers in the nullahs on the north face from which streams flow northwards into the Hunza valley. Before reaching Nagir, the aircraft passed over Baltit. At the former place intense excitement seemed to prevail amongst the populace, and as the aircraft flew low up the valley at Nagir a saluting gun, which had recently been given to the Mir of Nagir by the Government of India, was fired at intervals. The populace seemed to be all gathered on the house-tops, and showed their enthusiasm by waving their Chogas and throwing their hats in the air.

During the return trip a form of dust storm was observed in the Hunza Valley, but the weather conditions generally were perfect, the sky being clear and there being little or no surface wind.

On the flight over the Punial district, Maj. Gillan, the Political Agent, was carried as a passenger. Sher Kila and the Ishkuman Nullah area of the Punial district were visited, the Gilgit River being followed at a height of 12,000 ft. On the return flight the aircraft flew over the Nullahs on the left bank of the river and down the Hirali Nullah. Visibility being excellent, the views of the peaks in the Karakoram Range and the nearer Kailas, which were free from cloud, were magnificent.

The return flight from Gilgit to Risalpur was made on October 20 without incident. In addition to the Political Agent and the British officers, the Mir of Nagir and a large crowd witnessed the departure of the aircraft. Weather conditions were good, and the same course was followed as on the inward journey.

While the flight was at Gilgit a Chikor (mountain partridge) Drive was arranged by the Political Agent, in which all the officers took part, and a Scouts' dance was organised by the Gilgit Scouts. A polo match also took place during the stay.

Ponies had to be used for the transport of all ranks between the landing ground at Gilgit and the town, while mules conveyed the baggage.

Owing to the warmth obtained from the radiator, both in the pilots' and air-gunners' cockpits of the "Hart" aircraft, it was unnecessary to wear any additional flying clothing during the flight.

No difficulties of any kind were experienced during the flight.

BRITISH AIRCRAFT ABROAD: Fairey III.F seaplanes of the Greek Navy flying in formation above the "Isles of Greece."

THE ROYAL AIR FORCE

London Gazette, January 10, 1933.

General Duties Branch

The follg. Pilot Officers are promoted to rank of Flying Officer :—J. W. A. Hunnard (September 13, 1932) ; A. J. Pegg (November 29, 1932) ; F. L. White (November 29, 1932) ; D. Sloan (December 6, 1932) ; N. W. Mackenzie (December 26, 1932) ; T. P. Pilcher (December 26, 1932) ; W. N. Elwy-Jones (January 10). Pilot Officer M. Hare takes rank and precedence as if his appointment as Pilot Officer bore date August 6, 1931. Reduction takes effect from November 28, 1932.

Flt.-Lt. F. H. D. Henwood, D.F.C., is restored to full pay from half-pay ; Flt.-Lt. J. W. Bell, D.S.M., is restored to full pay from half-pay (December 22, 1932). Group Capt. (now Air Commodore) F. K. Haskins, D.S.C., A.D.C., is placed on half-pay list, Scale B, from December 10, 1932, to December 21, 1932, inclusive ; Wing Com. H. K. Thorold, D.S.C., D.F.C., A.F.C., is placed on half-pay list, Scale A (January 1) ; Sqdn. Ldr. H. M. Massey, M.C., is placed on half-pay list, Scale B, from January 9 to January 22 inclusive ; Flt.-Lt. W. A. B. Bowen-Buscarlet, D.F.C., is placed on half-pay list, Scale A, from January 10 to January 21 inclusive. F/O. W. R. C. Wilkins is transferred to Reserve, Class A (December 30, 1932) ; F/O. B. W. Figgins is transferred to the Reserve, Class A (January 7) ; F/O. C. G. Davies is transferred to Reserve, Class C (January 10) ; F/O. L. A. Bullard relinquishes his short service commn. on account of ill-health (January 10). *Gazette* December 27 1932, concerning Pilot Officer on probation L. W. Oliver is cancelled.

Memorandum

The permission granted to Lieutenant W. D. McKinnon to retain his rank is withdrawn on his conviction by the Civil Power (November 2, 1932).

ROYAL AIR FORCE RESERVE
RESERVE OF AIR FORCE OFFICERS

General Duties Branch

W. H. Craven is granted a commn. in Class AA (i) as a Pilot Officer on probation (November 16, 1932) ; Pilot Officer on probation Sidney Packwood Jackson is confirmed in rank (December 22, 1932). The follg. Pilot Officers are promoted to rank of Flying Officer :—T. C. Wallace (November 27, 1932) ; H. J. Greenland (December 1, 1932) ; C. D. Whittingham (December 2, 1932) ; G. S. Waller (December 22, 1932) ; C. E. Powell (December 25, 1932) ; C. B. Houlder (December 29, 1932) ; T. P. de Paravicini (December 29, 1932) ; G. E. T. Scrase (December 29, 1932).

The follg. are transferred from Class A to Class C :—Squadron Leader C. A. Rea, A.F.C. (September 12, 1932) ; Flt.-Lt. T. A. Thornton (January 10) ; Flying Officer F. G. Sinclair (October 7, 1932).

Flight Lieutenant E. J. Webster, D.F.C., relinquishes his commn. on completion of service (January 11). The follg. Flying Officers relinquish their commns. on completion of service :—L. H. A. Fray, J. Paterson, C. Thomas (December 23, 1932) ; A. W. G. Martin (December 31, 1932) ; H. T. Messenger, G. M. Pitts-Tucker (January 3).

Flying Officer W. M. Shoosmith relinquishes his commn. on completion of service and is permitted to retain his rank (August 23, 1932).

SPECIAL RESERVE

F. F. Rainsford is granted a commn, as a Pilot Officer on probation (December 17, 1932).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified :—

General Duties Branch

Wing Commanders : B. L. Huskisson, D.S.C., to Home Aircraft Depot, Henlow, 2.1.33, for Administrative duties, vice S/Ldr. H. A. Smith, M.C. F. C. V. Laws, O.B.E., to School of Photography, S. Farnborough, 1.1.33, to Command, vice W/Cdr. R. H. G. Neville, O.B.E., M.C.

Squadron Leader C. H. Stilwell to No. 5 Flying Training School, Sealand, 17.12.32, for Administrative duties.

Flight Lieutenants : R. J. M. de St. Leger, to R.A.F. Base, Gosport, 1.1.33. W. D. Gairdner, D.F.C., to No. 111 (F) Sqdn., Hornchurch, 21.12.32. H. I. Cozens, to Marine Aircraft Experimental Estab. Felixstowe, 2.1.33. C. S. Ellison, to No. 19 (F) Sqdn., Duxford, 31.12.32. C. W. Dicken, to No. 204 (F.B.) Sqdn., Mount Batten, 20.12.32. F. S. Hodder, to No. 210 (F.B.) Sqdn., Pembroke Dock, 20.12.32. P. Jones, to H.Q., Coastal Area, Lee-on-Solent, 3.1.33. H. W. St. John, D.F.C., to Station H.Q., Northolt, 3.1.33.

Flying Officers : R. J. Cohen, to R.A.F. Base, Gosport, 23.12.32. G. Burdick to No. 17 (F) Sqdn., Upavon, 2.12.32. F. S. Gardner, to No. 401 (F.F.) Flight, 2.1.33. E. J. Gracie, to No. 500 (County of Kent) (B) Sqdn., Manston, 23.12.32. W. H. Kyle, to No. 450 (F.S.R.) Flight, 2.1.33. K. N. Sayers, to No. 449 (F.S.R.) Flight, 2.1.33. H. A. Simmons, to No. 111 (F) Sqdn., Hornchurch, 1.1.33. D. C. T. Bennett, to No. 210 (F.B.) Sqdn., Pembroke Dock, 20.12.32. F. Crump, to No. 201 (F.B.) Sqdn., Calshot, 20.12.32. R. Harston, to Home Aircraft Depot, Henlow, 3.1.33.

Pilot Officer A. M. Carey, to No. 201 (F.B.) Sqdn., Calshot, 20.12.32.

Stores Branch

Flight Lieutenant F. E. R. Dixon, M.C., to R.A.F. Depot, Uxbridge, 6.1.33.

Flying Officers : S. W. Thomas, to H.Q., Air Defence of Gt. Britain, Uxbridge, 2.1.33. H. A. Wrigley, to Station H.Q., Worthy Down, 3.1.33.

Medical Branch

Flight Lieutenant J. F. S. Wiseman, to No. 3 Flying Training School, Grantham, 4.1.33.

Flying Officer F. H. Peterson, to No. 26 (A.C.) Sqdn., Catterick, 5.1.33.

Chaplains Branch

Rev. W. R. Marsh, to H.Q., Fighting Area, Uxbridge, 1.1.33, for duty as Staff Chaplain (United Board).

NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty :—

Lieut.—R. C. G. Smith, to *Ark Royal* (Jan. 18).

Lieut. (F/O., R.A.F.).—G. D. Anderson, to *Victory*, for R.A.F. Base, Gosport (Dec. 28).

Lieut. (F/O., R.A.F.).—N. S. Luard, to *Victory*, for R.A.F. Base, Gosport, and B.T.S. ; and M. Bruce, to *Victory*, for R.A.F. Stn., Netheravon, and for 405 Flight (Jan. 16).

ROYAL AIR FORCE

Sqd.-Ldr. H. V. Drew, O.B.E., A.F.C., to *Courageous* (Dec. 28).

Flt.-Lt. J. S. Nichol to *Glorious* (Jan. 3).

F/O. W. V. L. Spendlove, to *Furious*, for 401 Flight (Jan. 1).

F/O.s, R.A.F.—H. A. Simmons, to 111 (Fighter) Sqdn. (Jan. 1) ; F. S. Gardner, to *Furious*, for 401 Flight ; W. H. Kyle, to *Courageous*, for 450 Flight ; and K. N. Sayers, to *Furious*, for 449 Flight (Jan. 2).

Health of the Royal Air Force, 1931

THE sickness in the Air Force during the year 1931 shows an increase, on the whole, over the previous year, but a decrease compared with the periods 1926–1930 and 1921–25. The R.A.F. Medical Service abroad appear to have increased their knowledge as to the most effective preventatives against malaria especially in Iraq, though sandfly still seems to be a great nuisance. During the year there were 143 deaths compared with 135 of 1930, though again the figure for 1931 shows a decline over the yearly average for the periods 1926–1930 and 1921–1925 ; of these deaths, 94 were the results of injuries, and 49 the results of disease, and of the latter, cerebro-spinal fever accounted for 10 ; only one death was caused by an airscrew, and the injuries due to the same show a decrease over the previous year. Turning to flying casualties there were 68 deaths and 79 injuries, these were as follows : killed, 40 officers, 25 airmen, 3 cadets ; injured, 39 officers, 38 airmen, 2 cadets ; the number of deaths is an increase over the period 1928–1930, but it must be emphasised that more hours were flown per accident in 1931, than in previous years.

The healthiest place abroad appears to be one with the nomenclature "various small stations," few personnel are posted there, but those who are must lead a pleasant life, perhaps that is why the authorities keep the actual location of the place a secret for no address is given in the report, next on the list of desirable residences comes Aboukir in Egypt situated on the shores of the Mediterranean.

Catapult Trials

The following nomenclature will be used in all official correspondence, etc., for airframes and dummies used for catapult trials :—(i) *Service Type Catapult Replica.*—To denote a structure which is in essentials a replica of a certain type of aircraft such as is catapulted, to demonstrate that clearances, etc., are satisfactory. (ii) *Catapult Dummy.*—To denote a structure made up of portions of obsolete aircraft and not intended to represent any particular type.

No. 25 Squadron Reunion Dinner

A REUNION dinner of officers, past and present, of No. 25 Squadron, will be held at the Mayfair Hotel, London, W.1, on Friday, March 3, 1933. Particulars may be obtained from the Honorary Secretary, Flight-Lieutenant F. J. S. Short, No. 25 (Fighter) Squadron, Royal Air Force, Hawkinge, Folkestone, Kent.

Aircraft Name—Victoria VI

THE official name of "Victoria" aircraft fitted with "Pegasus" engines is "Victoria VI."

Imperial Defence College

THE following officers have completed satisfactorily a course at the Imperial Defence College which terminated on 16th December, 1932 :—Group Captain G. R. M. Reid, D.S.O., M.C., p.s.a., Wing Commander F. G. D. Hards, D.S.C., D.F.C., p.s.a., Wing Commander M. Henderson, D.S.O., p.s.a., Wing Commander A. T. Williams, O.B.E., p.s.a., Wing Commander H. K. Thorold, D.S.C., D.F.C., A.F.C., p.s.a.

No. 460 (T.B.) Flight—Re-equipment

No. 460 (T.B.) Flight will be re-equipped at R.A.F. Base, Gosport, with IIIF aircraft as a temporary measure, with effect from January 10, 1933, and will operate as a fleet spotter reconnaissance flight until further notice.

Abbotsinch Aerodrome

ABBOTSINCH will open as a R.A.F. station on January 23, 1933, and No. 602 (City of Glasgow) (Bomber) Squadron will move from Renfrew to Abbotsinch with effect from that date. The move will be completed by January 31, 1933.

R.A.F. Flying Accident

THE Air Ministry regrets to announce that, as a result of a collision between an "Iris" flying boat of No. 209 Squadron and a Naval Dockyard launch, which occurred in Plymouth Sound on January 12, No. 562311 L.AC. Alfred Dore Slatter was drowned, and No. 363720 L.AC. Acting Corporal, Frederick Leonard Petch sustained severe injuries. The first pilot of aircraft, Sqd. Ldr. John Hugh Oscar Jones, and the following members of the crew sustained injuries :—

No. 362421 Cpl. Henry Seward Beale Mace, No. 561661 AC. 1 Norman William Watson, No. 562632 AC. 1 James Douglas Frederick Williams, No. 562898 L.AC. Francis Joseph Soper and No. 562387 L.AC. Ernest Alfred Fuller. The second pilot, No. 363748 Sgt. Pilot John Herbert Claude Saffery, was not injured.

The Industry

A Practical "Hermes" Handbook

A NEW and very useful handbook containing notes on the care and maintenance of the 120-130-h.p. "Hermes" Mk. IV engine is now issued by the Cirrus-Hermes Engineering Co., Ltd. We are given, first, a complete specification of this well-known inverted 4-cylinder in-line engine, and then a general description in which each part of the engine is given a paragraph to itself, which is the best method of making a general engine description quite clear, especially for the novice pilot or apprentice engineer. Suitable illustrations, including a timing diagram, are a good feature too. It is also acceptable to have the material named of which each component part is manufactured. This information in the case of the "Hermes" completes one's confidence in the engine, for it is obviously a strong and reliable job of engineering. The section devoted to maintenance advises cleaning of the sparking plugs and resetting of the gap after each 10 hours' flying, a top overhaul after each 130 hours' flying, and a complete overhaul after every 400 hours' running. There are chapters on running instructions, examination and assembly of the engine and other relevant notes, each treated simply but practically. The entire contents are dealt with in such a practical manner and so adequately that all who have any interest in the "Hermes" engine, whether as users, ground engineers or designers of engine installations intended for engines of this class, will find the handbook invaluable. Presumably it can be obtained free of cost from the manufacturers, whose address is Croydon Aerodrome, Surrey.

Airspeed, Ltd., 1932 Report

The activities of Airspeed, Ltd., of York, during 1932 make cheerful reading when one considers that the company is young and has to find its own markets for commercial aircraft. Its first design, the Airspeed "Ferry," has enjoyed a successful *début*, and has undoubtedly attracted much attention to the company. At the beginning of last year the first "Ferry" was about 25 per cent. complete as regards construction and 50 per cent. as regards design. About 25 hands were employed in the shops then and the complete staff was 40 strong. At the peak of production in August last 105 people comprised the staff, and at the moment of writing, although reductions have brought the total down to 95, rapid increases are starting to cope with the spring rush.

The first "Ferry" was completed and sent to Martlesham in the middle of April, and it passed through its official tests in four days. It was then immediately handed over to Sir Alan Cobham for use with his National Aviation Day campaign. The second "Ferry" went to the same source early in June, and the two machines carried, between them, about 90,000 paying passengers during the season, and made 9,100 landings.

In May the company received a contract for the first A.S.5 "Courier" aircraft, a six-seater with retractable undercarriage. The design of this machine progressed all during the summer and is still in hand. In July one of the "Ferry" biplanes crashed and the repairs occupied the shops until middle August. Another "Ferry" was built for stock, and sold in December to an operator in the North. For the 1933 season two more of this type are being constructed.

A full range of spares is always held so that any part can be supplied from stock at a moment's notice.

Construction on the "Courier" was started in September, and the first test flights of this type are expected shortly. In that month a contract was also received from Messrs. Shackleton and Lee Murray for a small two-seater, which is now practically complete and will be flying shortly.

Mr. N. S. Norway, joint managing director of the company with Mr. A. Hessel Tiltman, rightly points out that although their 1932 report does not show a large output of aircraft, it is of importance to note that their policy is to concentrate on large machines. In selling price a "Ferry," which is a twelve-seater and powered with three engines of a total capacity of 360 h.p., is worth about six small two-seaters of the light aeroplane type, and one "Courier" is worth about four. On this basis it may fairly be said that production at York was equivalent to about 23 two-seater aeroplanes, together with the repair work and the manufacture of spares that would be associated with such production.

Another aspect in the company's report for last year that augurs well is that owing to their present factory being too small they are preparing to move to new accommodation at Portsmouth. After an inspection of various municipal and private aerodrome propositions during the summer they selected Portsmouth as the ideal position to establish a company of their kind permanently.

The construction of a new factory was started there in December and is expected to be ready by April 1. It will give twice the floor area of their York factory, and is on a site of four acres reserved by the company for expansion. Fortunately in the lay-out of the factory they have been unhampered by any existing buildings, which has enabled them to develop their ideas for economical production. The site is about ten minutes by car from the centre of Portsmouth, and is bounded on one side by the Municipal Aerodrome and on the other by Langstone Harbour, the latter providing admirable facilities for use as a seaplane base. It is practically deserted and is suitable for operation in any direction of the wind.

The past year has been a hard one for everyone working with Airspeed, Ltd., states Mr. Norway, but they feel that the company is now upon its feet and that the turnover for 1933 will be very much in excess of that for 1932.

"Vellumoid"

A SUBSTANTIAL discount to trade users of the sheet jointing material known as "Vellumoid" is announced by the producers, Chillcotts, Ltd., 240, Blackfriars Road, S.E.1.

IMPORTS AND EXPORTS

AEROPLANES, airships, balloons and parts thereof (not shown separately before 1910).

For 1910 and 1911 figures see FLIGHT for January 25, 1912.
For 1912 and 1913, see FLIGHT for January 17, 1914.
For 1914, see FLIGHT for January 15, 1915, and so on, yearly, the figures for 1930 being given in FLIGHT, January 16, 1931.

	Imports		Exports		Re-exports	
	1931.	1932.	1931.	1932.	1931.	1932.
	£	£	£	£	£	£
Jan. ..	7,965	2,456	142,596	122,942	1,074	863
Feb. ..	3,303	2,503	110,587	181,482	1,293	90
Mar. ..	5,615	1,946	83,088	167,195	3,441	200
April ..	2,216	622	213,401	142,145	530	1,128
May ..	1,964	1,747	275,382	138,356	108	5
June ..	6,780	398	78,298	126,330	361	125
July ..	1,790	1,070	177,006	142,702	131	120
Aug. ..	3,556	511	153,834	111,073	2,316	3
Sept...	1,088	2,161	218,987	115,464	1,074	—
Oct. ..	1,863	1,511	124,810	192,361	4,505	147
Nov. ..	3,097	182	124,374	113,181	1,004	14
Dec. ..	654	977	159,104	188,591	1,576	1
	39,708	16,084	1,861,367	1,741,822	16,503	2,696

PUBLICATIONS RECEIVED

The South American Handbook, 1933. Edited by H. Davies. London: Trade and Travel Publications, Ltd. Price 2s. 6d. net.

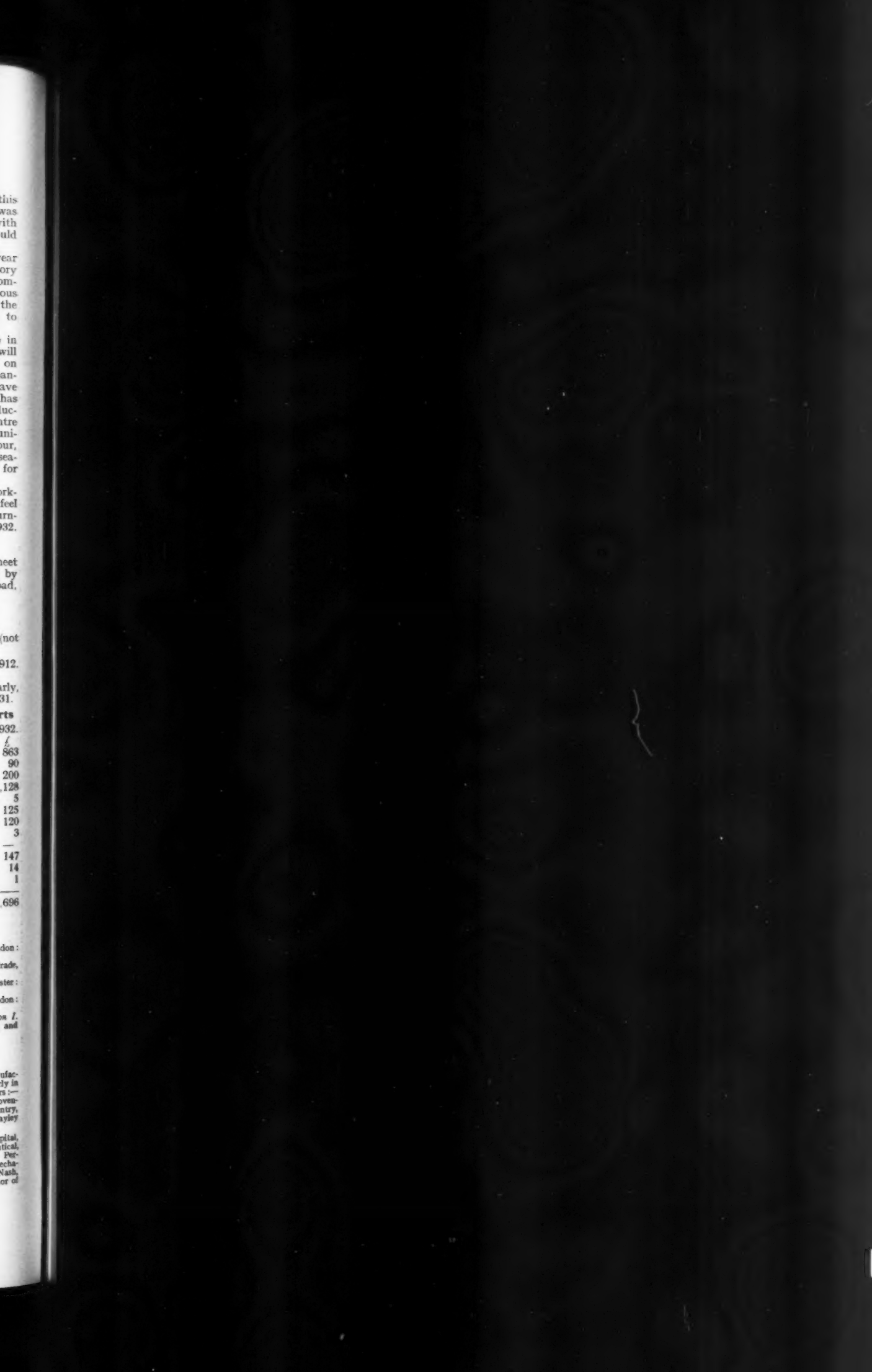
British Industries Fair, 1933. Catalogue of Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. Price 1s.

Mechanical World Year Book, 1933. Emmott and Co., Ltd., Mamchester: Price 1s. 6d. net.

How to Become an Air Pilot. By R. L. Preston. 3rd edition. London: Sampson Low, Marston and Co., Ltd. Price 3s. 6d. net.

The Garage Workers' Handbooks. Edited by J. R. Stuart. *Section I. Garage Equipment*. By P. A. Reynolds. London: Sir Isaac Pitman and Sons, Ltd. Price 1s. net.

NEW COMPANIES REGISTERED

COVENTRY FELT CO., LTD.—Capital, £2,000 in £1 shares. Manufacturers of and dealers in felts, paddings and similar goods, and particularly in connection with motor engineering, aeroplane furnishing, etc. Directors:—J. R. Holbrook, Elm Croft, Kenilworth Road, Balsall Common, near Coventry, house furnisher. S. R. Holbrook, 29, Woodland Avenue, Coventry, motor body trimming factor. Solicitors:—Mander Hadley & Co., Bayley Lane Chambers, Coventry.

NASH & THOMPSON, LTD., 18, Essex Street, Strand, W.C.2.—Capital, £300 in 1s. shares. Designers, manufacturers and suppliers of aeronautical, automobile, electrical and general engineering goods and toys, etc. Permanent directors:—A. G. F. Nash, "Ardua," Kingston Hill, Surrey, mechanical engineer (director of Nash Safe Load Indicators, Ltd., and Frazer Nash, Ltd.). E. G. Thompson, 89, Gloucester Terrace, W.2, engineer (director of International Model Aircraft Co., Ltd., and Fluid Presses, Ltd.).